Pests

1939
MAY
VOL. 7 NO. 5

ORGAN OF THE PEST CONTROL INDUSTRY

Exterminators
Fumigators
Termite Control Operators
Entomologists
Insecticide and Supply Mfgrs.

Special PEST Radio Bulletin!! Entire pest population destroyed in leading pest centers, as Pest Control operators start spring campaign with "CYANEGG" and the CYANIDE GENERATOR. Pest areas are without hope and await certain end as drive is extended!

SPECIAL BULLETIN for Fumigators! Use Cyanegg* and Cyanide Generator for quick, easy fumigation that's certain death for all PESTS and sure profit for you!

You need little equipment, only the new and efficient Cyanide Generator, placed and controlled outside of the building, charged with du Pont Cyanegg, the cheapest, most effective source of deadly HCN gas. This safer fumigation is more quickly handled. You do not wait to ventilate the building, after enough HCN is generated, you simply clean up your generator and go direct to your next job. Your customers appreciate the quickness and effectiveness of this fumigation. Let Cyanegg and the Cyanide generator start to build business for you now. Write for full details today.

DU PONT
REG. U. S. PAT. OFF.

FREE Valuable Fumigation Manual "Cyanegg Fumigation Manual" gives you money-making slants on this easy way to use HCN gas in your work. Write for it today.

*Reg. U. S. Pat. Off.

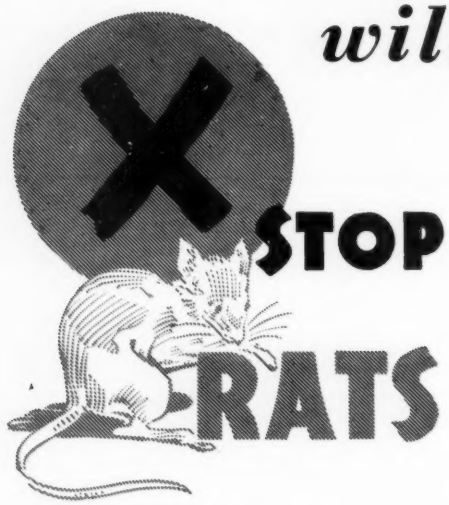
Plan to visit the du Pont exhibit at the GOLDEN GATE INTERNATIONAL EXPOSITION in San Francisco and at the NEW YORK WOLRD'S FAIR

The R. & H. Chemicals Department

E. I. DU PONT DE NEMOURS & CO., Inc. • *Wilmington, Delaware*

DISTRICT SALES OFFICES: BALTIMORE, BOSTON, CHARLOTTE, CHICAGO, CLEVELAND, KANSAS CITY, NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, SAN FRANCISCO

MULTI-LURE BAIT *will*



A deadly rodent poison which is secreted in an irresistible combination of vital food lures. MULTI-LURE comes ready-mixed—a restless life-like mixture that actually seems to be creeping up on the rats and mice.

SELL YOUR COMPLETE LINE OF SANITARY SUPPLIES **UNDER YOUR OWN LABEL**

Fuld Bros. catalog contains information about hundreds of Disinfectants, Deodorants, Insecticides, Cleaners, Floor Maintenance and kindred products which you could profitably feature. Write for the complete catalog and prices.

FULD MAKES IT FOR THE LEADERS

•

FULD BROS.

702-710 S. Wolfe St. Baltimore, Md.

Sales Offices:
Seattle - Kansas City - San Francisco - Boston

Metropolitan New York Office:
127 Troutman St., Brooklyn, N. Y.

Specialists in

Highest Quality Tested Pyrethrum and Rotenone Products

▼

John Powell & Co., Inc.

114 East 32nd Street
New York, N. Y.

MAGIKIL ANT BAIT JELLY

Easy TO USE

KILLS ANTS

IN HANDY TUBES AND TRAPS

SIZES to fit YOUR NEEDS
1 oz. Garden Tubes
3 oz. Estate Tubes
8 oz. Jumbo Tubes
5 lb. Cans
30 lb. Pails
Safety Traps for household use

SIMPLE! QUICK!

New! Improved! Sure!

Developed by one of the leading universities in the United States and further backed up by 5 years of steadily increasing sales.

We are also offering Thallium Sulphate 99.9% (made in U. S.) packed in 1-lb., 5-lb. and 10-lb. containers.
(Unlawful to sell for use or possession by the general public in California.)

PRICES ON REQUEST

For Further Details and Literature, Write to

LETHELIN PRODUCTS CO., Inc.

WOODRIDGE, NEW JERSEY

Pests

ORGAN OF THE PEST CONTROL INDUSTRY

Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers

COOPERATING WITH NATIONAL PEST CONTROL ASSOCIATION

AL COSSETTA, *Editor*
J. W. SMITH, *Associate Editor*

MAX ROSENTHAL, *National Advertising Rep.*
128 Lexington Ave., N. Y. City, Phone Mu. 4-9000

PUBLICATION OFFICE, 512 EAST 14th ST., KANSAS CITY, MO.

VOL. 7, NO. 5 | MAY, 1939 | ESTABLISHED 1933

NATIONAL PEST CONTROL ASSOCIATION, INC.

PRESIDENT
H. G. Irving Sameth, 200 Fifth Ave.....New York, N. Y.

REGIONAL VICE-PRESIDENTS
Walter S. McCloud, 510 North Dearborn St.....Chicago, Ill.
Otto Orkin, Post Office Box 647.....Atlanta, Ga.
Lawrence A. McKenna, 1651 Superior Ave.....Cleveland, Ohio
Wilbur F. Smith, 1811 E. Walnut St.....Pasadena, Calif.
Charles W. Houghton, 31 India St.....Boston, Mass.

SECRETARY
William O. Buettner, 3019 Fort Hamilton Pkwy.....Brooklyn, N. Y.

TREASURER
George R. Elliott, 58 Front St.....Worcester, Mass.

PUBLICITY AND PUBLIC RELATIONS
Louis Gatto.....Beaver Falls, Pa.

DIRECTORS - Three Years, 1938-1941
Alfred Zimmern.....Dallas, Texas
Walter B. Hill.....Memphis, Tenn.
Albert M. Akers.....Cleveland, Ohio
F. E. Bohman.....Hartford, Conn.
Martin Meyer.....Philadelphia, Pa.
John P. Linn.....Omaha, Nebr.
Jesse M. Miller.....Hollywood, Calif.

DIRECTORS - Two Years, 1938-1940
P. Calvert Cissell.....Washington, D. C.
Al Cossetta.....Kansas City, Mo.
Max J. Levy.....St. Paul, Minn.
Robert W. Laing.....Cleveland, Ohio
Irving H. Josephson.....New York, N. Y.
Harry J. Hammond.....Milwaukee, Wis.
A. T. Parsons.....San Mateo, Calif.

DIRECTORS - One Year, 1938-1939
Edward H. Arnott.....Indianapolis, Ind.
Wallace B. Tanner.....Los Angeles, Calif.
Gilbert M. Stover.....Baltimore, Md.
A. E. Ritt.....Philadelphia, Pa.
William Phippard.....Cincinnati, Ohio
Chas. Denny.....St. Louis, Mo.
Ernest R. Barber.....New Orleans, La.

CANADIAN REPRESENTATIVE
P. Henry Maheu.....Montreal, Canada

PAST PRESIDENTS - Ex-Officio Members
William O. Buettner.....Brooklyn, N. Y.
Thos. C. Raley.....St. Louis, Mo.
C. Norman Dold.....Chicago, Ill.
Bartlett W. Eldredge.....Waltham, Mass.
H. K. Steckel.....Columbus, Ohio

MEMBERSHIP

Three classes of membership: Active, Associated and Allied. ACTIVE MEMBERSHIP includes all firms engaged in any type of Pest Control operations (general extermination, fumigation, termite control, moth proofing) and dues are $10.00 per year. ASSOCIATE MEMBERSHIP includes branch offices of Active members and yearly dues are $7.50. ALLIED MEMBERSHIP includes manufacturers and supply houses.

STATEMENT

The National Association appreciates the co-operation given by way of publicity. The Association is not responsible for articles published unless credited to the Association. The list of officers and directors is published for informational purposes only.

For further details, communicate with

WILLIAM O. BUETTNER, Secretary
3019 Fort Hamilton Parkway Brooklyn, New York

CONTENTS

"Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of literary material pertaining to pest control and pests from any person interested in the advancement of the field."

Editorial 4-5

The Control of Fleas and Tropical Rat Mites.... 6
By Dr. M. A. Stewart

Ants—Identification and Control..... 8
By W. E. McCauley

Recent Progress in the Chemistry of Pyrethrum Flowers 9
By H. L. Haller and F. B. LaForge

The Necessity of a Changing World.....10
By J. J. Davis

Moths 16
By Howard E. Jennings

Unusual Pest Problems.....17
By J. J. Davis

The Termite Operator.....18
By John L. Farley

Red Squill 20

Local Organization News.....21

What's New in Pest Control—Personals.....24

Write For These Booklets.....26

Additional Patents Relating to Pest Control.....28
By Dr. R. C. Roark

Published monthly by Pests, 512 East 14th Street, Kansas City, Missouri. Subscription rate in the United States and Possessions $3.00 per year; Foreign $3.50 per year; Single Copies 25 cents; Bundles of 25 Copies $5.00. Publishers not responsible for unsolicited manuscripts. No manuscripts will be returned. All advertising copy and contributions must be in our hands by the 15th of the preceeding month of the issue in which they are to appear. Three weeks' advance notice necessary for change of address. Both old and new address must be given.

EDITORIAL

The Payoff

IT IS ALWAYS the pest control service industry that is blamed for many of the so-called abuses, but we wonder at times whether one has evaluated the harm that has come to our industry through government financed rat campaigns and general publicity of more or less official nature which tends to minimize the technique and understanding that makes up proper exterminating, fumigating, and pest control operations. Altogether too frequently no reference is made in literature about an important industry which is prepared to serve the public. Rat campaigns financed in part with your and my money are conducted without as much as the courtesy of acknowledging an industry. Comparatively untrained men are given the impression that there is nothing to exterminating; they are sent out with a few baits. Even government officials, mainly in the cities, have not investigated thoroughly men who are engaged to conduct rat campaigns. It would appear to be the glorious aftermath of giving a false security to the public as well as men temporarily employed to believe that a few simple things alone are necessary.

The itinerant and overnight operator might well be considered as the sequence to such activities and publicity that neglected recognition of the pest control industry.

We do not say that the following concerns an itinerant, but it is quite possible that the firm in question was given its ideas to do what it is doing as a result of the program that has harmed our industry. We are purposely omitting any reference to names, or indicating the locality involved. We submit the newspaper story:

Exterminator Starting on Spring Clean Up

(Name of company omitted) which operates a chain of offices in (section of country omitted), will put on a pre-summer clean up month which will be a great saving and a big help to property owners.

The concern, the largest of its kind operating in (section omitted) has the most modern equipment known to science and a crew of highly trained engineers operating in this territory. The client is given guaranteed satisfaction and the security of knowing that they are dealing with a concern which uses methods recommended by the U. S. Department of Agriculture.

The management states that in the past, property owners have resorted to chemicals sold in stores. In some cases very little satisfaction has been derived from such chemicals perhaps due to inferiority or the lack of knowledge in using these exterminators.

(Company name omitted) is offering free rat and mice poison which can be obtained by writing directly to the general office of the concern and enclosing a small amount to cover postage and packing. This is an introductory offer which is sponsored by the company for the company does not handle rat or mice work because the cost of doing the work is but a few cents and can be done without the experience of exterminators.

The manager states that during the next 30 days the firm will operate with a full crew in this locality. This means a saving in transportation of equipment, thus this saving is passed on to those in need of the services. Estimates on required work are given gratis. All work done by the concern carries a full year guarantee.

Savings during this clean up campaign amount to about a third. The campaign will extend from April 10 to May 10. If necessity demands the services of a reliable exterminator call the local representative (name of company omitted).

An interested member of the industry took occasion to comment on the situation to the gentleman alleged to be largely responsible for engaging the individual, and we understand that the gentleman in question is not only active in the management of the newspaper, but also in the Chamber of Commerce. Study these remarks and perhaps our industry is not to blame so much as is made to appear. Said the member of the industry:

"I am sorry to have missed you at (name of city) today, for I should have liked to check on the above concern with you, in both your newspaper and Chamber capacities.

"Presumably the young lady in the office has passed on to you the reprint from the trade paper 'Pests,' the gist of which will indicate the basis for our interest, as an association, in the problem of the itinerant campaign promoter. Although in New England we have been relatively free from this racket, it is an ever-recurring one in the country as a whole. We repeatedly have occasion to cooperate with local Better Business Bureaus, Chambers of Commerce and law enforcement officials in apprehending opportunists in this particular field. The interest of both the community involved and of the legitimate pest control industry is obvious.

"First let me say that I have no information, nor opinion, that the concern in question falls in this class. There are, however, a number of points raised by the write-up which appeared in the (name of newspaper and date), "Exterminator Starting on Spring Clean Up" which justly invite scrutiny. I hope you will go to the trouble of re-reading critically that amazing article.

"Without burdening you with a detailed analysis of the many challenging statements, I will mention a few, with the preliminary statement that such a firm apparently is wholly unknown to pest control operators in (mention of city omitted), in fact in (mention of state omitted.) In (mention of city omitted), where it seems to have acquired a telephone address as 'headquarters,' no 'certificate of business style' has been filed with the city clerk, as required by law; nor do the principals appear to be known here individually or in a business way. All this is unimportant, except in connection with the quite ambitious claims which appear in the (name of newspaper) article.

" 'Which operates a chain of offices in (section of the country)'—highly questionable at least. We know of only one established pest control firm in this section

of the country which operates more than one office. A newcomer could hardly attain a 'chain' status at birth—at least in this business.

" 'Largest of its kind operating in (section of country)'—unless 'of its kind' is the joker, this statement is obviously untrue.

" 'Has the most modern equipment known to science' —even the best equipped of the many excellent established firms in the country would blush at the range of this superlative.

" 'A crew of highly trained engineers'—even assuming this proprietor actually employs anyone, of course there is no such thing as an 'Engineer,' in connection with the pest control or exterminating industry. No institution of learning grants such a degree, nor any governmental agency such a title.

" 'Methods recommended by the U. S. Department of Agriculture.'—No governmental bureau authorizes or sanctions such statements as this, which either directly or by implication suggest government endorsement of materials, methods or organizations. Numerous bureaus of the federal government cooperate closely with our association on technical matters; we know that they consider statements such as the above as hitting below the belt.

"Rather than continue further, may I say that the balance of this short article contains the most surprising and confusing punishment of technique and ethics which it has been my privilege to encounter under a single heading. I cannot help being just a bit puzzled that, in this day and age, such should be considered acceptable from the newspaper point of view."

"Safeguarding Public Health"

The True Responsibility of the Exterminating Industry

"Safeguarding Public Health" is the title of an article that was written by William Oseasohn, president of the Westco Exterminating Company of White Plains, New York, and published in "The Magazine, Westchester," March, 1939. There are thoughts in this article that might well be embodied by the pest control industry in the preparation of material for similar publications, which would give reflection as to the responsibility of the exterminating industry toward clients.

We reprint verbatim the remarks:

Every ethical exterminating organization is fully mindful of its responsibility towards safeguarding Public Health and renders a highly efficient and effective "service" to maintain cleanliness and complete pest control on the premises it is entrusted to "service."

Successful Realty Management groups and owners of private and public buildings are also fully mindful of their responsibility to the public that either live in their properties or congregate in their commercial buildings and employ consistently reliable exterminating organizations to "service" their properties for the dual purpose of safeguarding Public Health and also for the protection of their properties.

Realtors in many cases recommend to private home owners the importance of employing an exterminator as a definite safeguard against the dangers of vermin that very often is brought into the home in packages delivered from retail establishments or other outside sources.

The owner or manager of a piece of property fully realizes the constant danger of various types of vermin that are brought into his property and as such has his premises "serviced" regularly all year round to insure cleanliness and complete pest control as only in this manner is Public Health safeguarded and property kept in good condition.

We, in the exterminating industry, know from practical experience that in spite of the progress of civilization in the arts and sciences, man has not as yet found a method whereby "vermin" can be exterminated permanently. We know how and do get rid of an infestation. Only through consistent checking do we keep the condition under control. Therefore, we emphasize the fact that only by "consistent servicing" do we keep premises clean and under control. This important fact is also well known by those who own or manage property.

While we may dream of "perfection," we must be practical and fully realize that we must have the full and sincere cooperation of the owner or manager of every type of property if we as an industry expect to do our full share to safeguard Public Health.

By employing an exterminating organization to "service" consistently every piece of property where people live, work and congregate, we hope to approach a goal whereby all of us who share in this important responsibility will rightfully feel we have rendered a genuine service to humanity.

Pest Control

MOMENTUM is in the right direction, but observations still persist that the Pest Control Service Industry is still asleep on its feet. What about changing the classified telephone directory heading to an all-inclusive major title of "Pest control"?

A newspaper clipping bureau which supplies the National Pest Control Association with news pertaining to the industry provided indirectly the substantiation of the trend toward "Pest Control." What do the newspaper headings say? Let us quote a few:

"Federal and State Officials Discuss Pest Control";
"Pests Always Fighting Man";
"Pests in Home No Reflection on Housewife";
"Statistics on Pests";
"Lead Pest Fight";
"War Against Termite Pests Is Renewed";
"Conferees Agree on Pest Control";
"Pest Control—Are Pests Getting Worse";
"Household Pests";
"Summer Pest Control Program";
"Pest Control District Bill Recommended";
"Means of Fighting the Pests Most Often Met Hereabout";
"Senate Reduces Insect Pest Fund";
"Pests May Inherit the Earth";
"Plans Made for Annual Pest Fight";
"Warning on Pests";
"Serious Pest Invasion";
"Pest Control Cost Rises During the Year";
"Pest Exterminating Outlined for Club";
"Kiwanians to Hear Pest Control Expert";
"Pest Control to Be the Topic";
"Pest Control Area Bill Recommended";
"Pest Control Aids Listed in U. S. Books";
"Pest Control Mass Meeting Will Be Held";
"Pest Control Program Mapped";
"Pests Killed by Chemicals."

With officials, entomologists, and many leaders in the industry making greater and greater use of the term "pest control," the industry as a whole might well wage a more aggressive campaign to clean up the meaningless headings in the classified telephone directories. See April issue of "Pests."

The Control of Fleas and Tropical Rat Mites

By DR. M. A. STEWART,
Division of Entomology and Parasitology, University of California

EDITOR'S NOTE: *The following paper was presented by Dr. M. A. Stewart at the Second Annual Pacific Coast Pest Control Operators' Conference recently held at Berkeley, Calif. Following the reading of the paper there was discussion, questions and answers.*

THE fleas belong to the order Siphonaptera which is a small order of insects, but nevertheless an important one, since all of its members are external parasites of mammals and birds. Representatives of this order are found from the Arctic regions to the tropics and a number of economic species have spread throughout the civilized world through the careless and unintentional transportation of their hosts in cargoes carried by ships and trains.

These insects have what is known as a complete metamorphosis. The fertilized females deposit minute whitish glistening eggs, which may be smooth or sticky according to the species, either on the bodies of their hosts or in the nests or resting places of the hosts. Most frequently the eggs are deposited in the nests or resting places. If the eggs are laid on the body of the host ultimately they are either shaken off or fall off. From these eggs hatch small whitish larvae.

The larvae have very thin body walls and are quite susceptible to dessicating influences in the environment. They are without legs but possess circular rows of long hairs and are capable of crawling about actively. They shun light and require a fair amount of moisture. The larvae have a biting-chewing type of mouth parts and feed upon a variety of dry organic debris, including dried drops of blood which have been expelled by the adult fleas. The larval period is, of course, one of active feeding and rapid growth. Just before the larval stage is completed, a silken cocoon, of a dirty appearance, is spun.

Pupation occurs within the cocoon. At first the pupa is glistening white but it gradually changes to a dark brown or black color. The pupal stage is one of external quiescence and the pupa does not move about or feed. The adults emerging from the pupae are very sensitive to mechanical disturbances of any kind before escaping from the cocoons. A sudden vibration may liberate adults from cocoons in large numbers.

Newly emerged adults are usually very fat and can live for several months without food. As a rule the males emerge first, but the females usually out-number them. The female flea must have a blood meal before her eggs can be fertilized. Adult fleas remain on their hosts in varying degrees of attachment. The majority of them visit the body of the host for relatively short periods of time for the purpose of obtaining food, in the form of blood, but the stick-tight flea (**Echidnophaga gallinacea** Westw.) and the chigoe (**Tunga penetrans** L.) remain attached to their hosts throughout nearly the entire adult stage. Adult fleas have, of course, piercing-sucking mouthparts. On smooth surfaces, fleas progress by means of short jumps. They may sham death when disturbed. They usually leave a dead host as soon as the body gets cold. They like warmth and moisture, but shun daylight. It has been determined that some adult fleas can jump vertically 7¾ inches and horizontally 13 inches. The old idea of marked host specificity is not accurate. Whereas most species of fleas seem to possess certain host preferences they are by no means confined to these hosts or even to their close relatives. As a whole, hosts with nests are more commonly preferred than those without them. This is particularly true in the case of those species, such as the European rat flea (**Nosopsyllus fasciatus** (Bosc.)), whose larvae appear to require a meal of dried blood derived from the excreta of the adult fleas for their development. Also in such cases we observe that the adults spend a great deal more time in the nests than on the hosts, which is a provision of nature to supply the larvae with the necessary food. Contrasted with fleas of this type are those such as the Asiatic rat flea (**Xenopsylla cheopis** (Roths.)) whose larvae apparently do not require dried blood for their subsistence. Adult fleas of this latter type, consequently, are found more frequently on the hosts and they are therefore of greater potential danger as disease vectors and more liable to become pests of man.

The life-cycles of fleas are markedly influenced by climatic factors. Low atmospheric humidities in particular are inimical to them. The length of each developmental stage is very largely determined by the prevailing temperature and humidity. Longevity, generally speaking, is directly proportional to humidity and inversely proportional to temperature. Adult fleas, however, are able to survive low humidities which would kill larvae. Different species have different ranges of favorable temperature and humidity. The common fleas infesting houses, such as the cat and dog fleas (**Ctenocephalides felis** (Bouché) and **Ct. canis** (Curtis)) and the human flea (**Pulex irritans** L.), have typical life-cycles which under favorable conditions are about as follows: the eggs hatch in 1 or 2 days; larvae begin spinning their cocoons in from 7 to 14 days after hatching; and the adults appear 5 days later. Thus the entire life-cycle may be completed in about 2 weeks. Adults may remain alive for more than 5 years if the environmental conditions are such as to foster longevity; such extremely long adult life is, of course, exceptional; usually they live only a few months.

Although the fleas constitute a small order of insects, they are, nevertheless, of very considerable economic importance. Many people, particularly on the West Coast, suffer greatly from their bites, sometimes even to the extent of developing an acute allergic condition. In certain tropical portions of the world, i. e., South and Central America and Africa, humans are tortured by the chigoe fleas which burrow deeply into the skin, thereby giving rise to intense irritation and ulcers which are caused chiefly by secondary bacterial invasion. Various domesticated mammals such as cats, dogs and pigs are attacked and sometimes seriously irritated by fleas. Heavy losses are occasionally encountered among poultry from attacks of sticktight fleas (**Echidnophaga gallinacea** Westw.), European hen fleas (**Ceratophyllus gallinae** Schrank), and American hen fleas (**Ceratophyllus niger** Fox). Rat fleas, the mouse flea, the human flea and the dog flea are intermediate hosts and transmitting agents of a small, but serious tapeworm (**Hymenolepis diminuta** (Rudolphi)) to which man, dogs and rats are susceptible. Also cat and dog fleas are intermediate hosts and vectors of two common tapeworms in dogs (**Dipylidium caninum** (L.) and **D. sexcoronatum** v. Rátz) which can infect man. Even more important, at times, is the fact that fleas transmit endemic typhus, a disease which has its reservoir in rats, to man and plague, the dread Black Death of the Middle Ages.

The species of fleas most commonly encountered in pest control operations are the cat flea (**Ctenocephalides felis** (Bouché)), the human flea (**Pulex irritans** L.), the dog flea (**Ctenocephalides canis** (Curtis)) and occasionally rat fleas (**Nosophyllus fasciatus** (Bosc.) and **Xenopsylla cheopis** (Roths.)), the mouse flea (**Ctenopsyllus segnis** Schön) and the sticktight flea (**Echidnophaga gallinacea** Westw.) which attacks both birds and mammals. Also, people working around poultry are occasionally attacked by the American hen flea (**Ceratophyllus niger** Fox) and the European hen flea (**Ceratophyllus gallinae** Schrank).

With the exception of the human flea, except when it is parasitizing cats and dogs, control measures must be directed against the hosts as well as against the fleas themselves. There are three factors to be considered in flea control; the actual destruction of the insects, the elimination of their breeding places and either the destruction or the control of the wild and domesticated hosts.

One of the first control measures in ridding a building of fleas is either to keep dogs and cats out or to keep them free from fleas rigorously and to control rats and mice. In severe infestations of buildings or ships, fumigation with hydrocyanic acid gas is necessary. Where this is impracticable, satisfactory results may be obtained by covering the floor of each infested room with flaked naphthalene and closing up the room for 24 hours. In those rare cases where either type of fumigation might be impractical, the next best procedure would be to wash thoroughly the floor and part way up the walls with a crude oil emulsion consisting of 80% crude oil and 20% whale-oil soap. This substance is a jelly which mixes freely with water, and may be used at 10% strength.

Fleas breeding in dirt floors or in soil with no vegetation under or around buildings may be controlled by scattering common salt over the ground and then wetting down thoroughly with water. A second sprinkling of water may be necessary two or three days later.

Occasionally lawns get very heavily infested with fleas. Such infestations are very difficult to control because the lawns will be ruined by the application of salt. Probably the best results can be obtained by thorough spraying with nicotine sulphate at a 1:400 dilution.

Let us now return to an individual consideration of those species which were stated to be of most common occurrence in pest control operations.

The cat and dog fleas very commonly attack man since they are more or less regularly introduced into dwellings on their hosts. Cats and dogs may be freed of the

parasites by any one of several methods. They may be washed thoroughly, not overlooking the head, in warm water and strong tar soap. The careful rubbing into the fur of cats and dogs of pyrethrum powder stupifies the fleas, which may be brushed off on to a piece of paper and burned. Fresh derris powder has also been used in the same way with good results. The sleeping quarters of the animals should be thoroughly cleaned and scrubbed with hot water and strong laundry soap, or preferably with the crude oil emulsion previously mentioned, whenever possible, and blankets, etc., upon which the pets sleep should either be thoroughly laundred or burned. Regular treatments have to be maintained because of the constantly recurring reinfestations. Stray dogs and cats should be discouraged from visiting the premises. When these fleas become established in the household, the usual control measure of fumigation has to be practiced.

The human flea attacks particularly man, dogs, cats and pigs. Infestations in dwelling houses are chiefly due to lack of cleanliness with the consequent accumulation of dust and organic debris, proximity to buildings, housing domestic animals where fleas are breeding, free access to the house of cats and dogs, and the introduction on the clothing and bodies of persons who have been in a place where fleas are abundant. When relatively few fleas attack people in houses, and especially when cats and dogs are allowed in the house, the breeding places should be looked for in, or beneath, out-buildings frequented by the animals. When such breeding places are found, it is necessary to clean up and burn all of the loose material in which fleas may breed. Then salt and water should be applied to the ground; occasionally it may be necessary to wet down the salt covered ground as many as four or five times. In those places where crude petroleum is cheap, and especially where water is scarce or cannot be applied easily, thoroughly sprinkling the ground with this oil will give satisfactory results. Sprinkling lime freely over the infested areas, after first cleaning them, apparently kills many immature fleas. If a building is to be rid of these fleas, the hosts must be controlled and the breeding centers must be destroyed. Rats and mice also act as hosts for this species, as well as the cat and dog fleas, and therefore must be killed. It should be borne in mind, however, that frequently immediately after controlling the rats or mice in a dwelling, the human inhabitants are severely attacked by fleas which had previously been living on the rodent hosts and in their nests, which may make fumigation imperative. When buildings are heavily infested with fleas they should, of course, be fumigated. Dry heat may be substituted for fumigants sometimes, provided that there are no protected hiding places present and that a temperature of 110° F. may be maintained for at least three hours.

Rat and mouse fleas are controlled in the same way as is the human flea with special emphasis laid upon rat and mice control.

Hen fleas may be controlled by cleaning thoroughly the buildings occupied by the birds and burning all litter. Care should be taken not to distribute fleas in the litter along the way from the place where it is collected to where it is burned. Following this the birds may be dipped in the morning of a warm day in a 2% carbolic solution and the interior of the buildings should be thoroughly sprayed with the same material. With the exception of the sticktight flea, those species infesting birds spend but relatively little time upon the hosts. The soil of the runways should be appropriately treated. Dogs, cats, wild birds, rats and mice which may introduce the fleas should not have access to the fowl run.

Flea infestations are, of course, dependant upon dispersal followed by a build-up in population in the new location. Some idea as to what environmental factors determine the population densities of these insects has already been presented. Flea dispersal may be effected in any one of several ways: dogs and cats roaming about; humans picking up fleas on their bodies in one place and carrying them to another, which is usually of very minor importance; transportation of infested rodents through commerce; migrations of infested rodents; and by shipments of previously contaminated but rodent-free cargoes in which fleas are breeding such as gunny-sacking, hides, cottonseed, cotton, sand, grain, rice, etc. Of course, there must be a certain amount of moisture present in these cargoes.

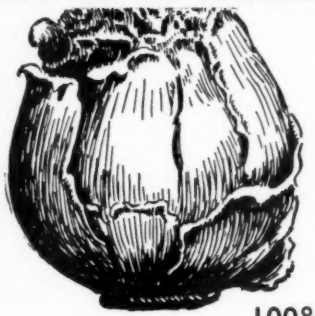
The itching of humans caused by the bites of fleas can be relieved by the use of lotions such as 2 to 3% carbolic acid, camphor, or menthol. Repellants are not particularly satisfactory and there is no general agreement as to the efficacy of any single one.

The tropical rat mite (**Liponyssus bacoti** (Hirst)), which is the common rat mite of warm climates, but is cosmopolitan in distribution, has become of considerable importance as it has spread over North America because of its ability to produce in humans an acute dermatitis and to transmit endemic typhus.

The tropical rat mite feeds only on blood and drops off its hosts to hide in cracks

A RATICIDE FOR SURE-KILL RAT EXTERMINATION

HOPKINS' REDRATSQUIL (TRADE-MARK)



IN POWDER AND LIQUID FORM

Made from the genuine Red Squill Bulbs — the world's most potent Raticide for rodent extermination. Oven dried under a temperature of 176° F. BIOLOGICALLY TESTED to assure maximum killing power. Exterminators who use HOPKINS' REDRATSQUIL find that rodents take it readily, and it retains its killing power indefinitely.

100% PYRETHRUM FLOWERS MEANS 100% INSECT KILLING POWER

HOPKINS' PYRETHRUM POWDER AND EXTRACTS

Full-strength, 100% Pyrethrum Flowers are used by Hopkins to produce potent, sure-kill insecticides. HOPKINS' PYRETHRUM POWDER is milled in such a way as to keep the particles in suspension longer than usual. This simply means that you thus make sure the particles reach the nest and exterminate the young. Milled to any degree of fineness. HOPKINS' CONCENTRATED EXTRACTS give you the same extraordinary killing power in liquid form.

Write for Samples and Prices

J. L. HOPKINS & CO. IMPORTERS » MILLERS » MANUFACTURERS
220 BROADWAY • NEW YORK, N. Y.

Ants – Identification and Control

EDITOR'S NOTE: *The Third Annual Pest Control Operators Conference held at Purdue University, Lafayette, Indiana, attracted over 120 pest control operators from twenty states and Canada. During the conference outstanding entomologists led discussions. The following paper was used in connection with discussion by Mr. W. E. McCauley, Assistant Entomologist, State Natural History Survey Division, Urbana, Illinois.*

SEPARATION of common ants is not usually necessary for satisfactory control. A hand lens is absolutely necessary for study of characters used to identify ants.

The two common ants most likely to be mistaken for each other:

Thief Ant

1. Tiny red ant—two segments pedicel.
2. Feeds on grasses, grain, or dead insects.
3. Nests usually small cavities in soil **outside** infested building, often associated with feeding places for dogs.
4. Active—summer only with rare exceptions.
5. Antennae—ten segments.
6. Antennal club of two segments.

Pharaoh's Ant

1. Tiny red ant—two segments in pedicel.
2. Feeds on sweets, greases, grains, pastries, dead insects and water.
3. Nests (in northern climate) always inside buildings, any place in walls, floors, cabinets, or utilities, light switches, conduit pipe, etc.
4. Active—periodically throughout year.
5. Antennae—eleven segments.
6. Antennal club of three segments.

The easiest way to settle your worries about the identity of the ants or other insects is to supply your service men with small vials of cheap alcohol and a camel's hair brush. When they happen onto some ants they can wet the brush in the alcohol and hurriedly gather a few specimens which will stick to the wet brush. By dipping the brush in the alcohol the ants are removed and are ready to mail. (Incidentally, this works for any of the smaller insects such as springtails, beetles, etc.) It has the further advantage that the specimens reach the entomologist in a condition so they can be identified.

Separation of the common ants by their habits is possible so far as method of extermination is concerned; this is not possible so far as identity is concerned. Common Illinois ants may be divided according to mode of annoyance. (This considers only troublesome ants.)

1. Accidental or occasionally troublesome:

(a) **Lasius or corn field ant**—small mounds in lawn. One of most common of this group yields readily to sweet baits. Outside poisoning recommended.

(b) **Odorous ant, Tapinoma sp.** — nests around shrubbery.. Small dark (not tiny) ant can become very annoying—may overrun the house, where large nests are present outside. Carelessness outside results in trouble from this species. Usually colony destruction by fumigation or outside poisoning is best remedy. Dr. M. R. Smith found this ant most common in Urbana some years ago. Habits resemble Argentine ant.

(c) **Carpenter ants, Camponotus sp.**— Variable sized black ants above moderate size. Troublesome anywhere in house, depending upon nest location. They may bite. Presence of these ants should always be followed by search for nest because of their potential threat to the framing of the house. Best handled by a treatment of nest. They will take sweet baits readily, especially granular baits or sugar baits.

(d) **Pavement ants, Formica sp.**—Moderate-sized black ants. Very speedy, "race horse ants" would be a good name. Small colonies outside especially under sidewalk, terraces, etc. Take sweet granular baits best. Not often troublesome in great numbers. Great foragers, may travel long distance.

(e) **Thief ant, Solenopsis sp.**—Already mentioned.

(f) **Acrobatic ant, Crematogaster**—Moderate-sized black shiny ant. When alarmed they raise their abdomen over their backs in a peculiar manner, hence the name. Large nests, usually in wood. Usually forage in droves traveling single file. Sometimes annoying by their crawling through various parts of a building. Sometimes they nest in walls—around windows. Will bite if annoyed. Commonly nest in stumps, logs, etc. May be troublesome in the kitchen. The most spectacular of all our ants. Will feed on baits if troublesome around foods. If troublesome because of migration, barriers or nest destruction will be necessary, as at such times they are apparently not interested in food materials.

2. Those ants troublesome throughout year.

(a) **Pharaoh's ant**—most common in our territory (already discussed).

(b) **Crazy ant, Prenolepis longicornis**—Occasionally found in cities. Just becoming established. Long legged black ant. Feeds on some sweets. Much remains to be learned about habits and control of this ant.

(c) (Rarely in this group) **Tapinoma or odorous ants.** Described before.

3. Troublesome at swarming time.

(a) Chief offender in this group is the large yellow ant, **Lasius interjectus**—often mistaken for termites as they swarm from under basement floors about the time termites are swarming. Very strong odor of citronella. Most easily controlled by colony treatment much as termites are handled. Will not feed on baits. No particular damage except annoyance by its presence.

Control measures for ants consist, in order used: (1) contact insecticides, liquids and powders; (2) Stomach poisons fed as attractive baits, strong or weak poisons; (3) Fumigants applied to colonies in soil or wood; (4) Barriers of mercury, fluorine, or organic compounds applied as paints, tapes, liquids. What to use depends entirely upon the situation, ants, habits, nature of client, rapidity of results desired, and durability of results desired. Don't advertise, "results in three hours," and attempt to get them with weak stomach poisons.

Mechanics of application is very important. Sanitation inside and **outside** house very important considerations for control of most ants. Outside treatments almost essential for lasting results where outside species are involved.

Strength of poison still open to debate. Remember that economy and safety are both in favor of weaker baits (not over .5 Thallium sulfate). Quick results favor stronger baits.

Some ants respond better to change of bait materials.

Pharaoh's ant is very adaptable to conditions of modern living. They are definitely more active at night, thus more can be learned by examinations at night. These ants respond better to variation of baits such as fruits, pastries, peanut butter, or syrups. Adaptability of queens make transplanting of the colonies common, hence they are easily spread by channels of commerce. Continued baiting is necessary for complete eradication. Baits must be kept exposed even after ninety-eight per cent of the original number has disappeared.

The Control of Fleas and Tropical Rat Mites

Continued from page 7

and crevices after each meal. It may feed on a variety of different animals, rats, mice, domestic animals and man, although rats are preferred, during its life-cycle. Each mite requires four or five blood-meals from the larval to the adult stage. Under optimum conditions, they feed at intervals of about three days. The life-cycle is relatively short. The eggs hatch in four days and, under favorable conditions, the adult stage may be attained 12 days later. Moulting and egg deposition occurs in cracks and crevices. This mite prefers to hide during the day and crawl about and feed at night; however, it will attack hosts during the day if necessary.

The tropical rat mite during all stages of development, after hatching, is attracted by the heat from hot water pipes or stoves as well as by the body temperature of the host; consequently in searching for this parasite, a light should be used and warm places, particularly around hot water pipes and along the facings of woodwork, should be examined.

The only way in which to control the tropical rat mite effectively is to destroy the rats and mice in and about the infested building. If all the rats and mice are destroyed, a period of at least 18 days must elapse before all of the mites die of starvation. However, when the rat and mouse populations are destroyed, the mites seek other hosts for their blood-meals. Consequently in buildings occupied by persons, tropical rat mite attack sometimes follows rodent control campaigns. Therefore, when mite-infested rats and mice are being destroyed in buildings frequented by humans it is usually necessary to take direct measures against the mites themselves. This is most efficiently done by fumigation with hydrocyanic acid gas, using 10 ounces of sodium cyanide for each 1000 cubic feet of space. Where fumigation is impossible, spraying thoroughly with highly refined kerosene oil and lauryl thiocyanate gives good results.

"There is no field of service better than the place you now occupy."

Recent Progress in the Chemistry Of Pyrethrum Flowers

By H. L. HALLER *and* F. B. LaFORGE, *Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.*

FOR PRACTICAL purposes pyrethrin I and pyrethrin II, which are responsible for the insecticidal property of pyrethrum flowers, have been considered as having equal toxicity to insects, and flowers are bought and sold on the basis of their total pyrethrin content. Tests by various investigators, however, have led to wide differences of opinions as to the relative insecticidal values of the two active constituents.[1]

These differences have arisen from several causes. Impure mixtures of the two pyrethrins may have been employed for tests, or supposedly pure compounds may have been altered chemically in the process of isolation. Pyrethrin I is assumed to have been obtained pure by way of its crystalline semicarbazone. Pyrethrin II has been obtained only by partial synthesis from its constituents. In both processes several chemical changes in the isolated compounds may have occurred. Moreover, the possibility of the natural occurrence of more than one form of each pyrethrin has not been considered. Another reason for differences in results is that various insects have been used in the tests, and it is known that organic compounds vary in their toxicity to different insects.

Since pyrethrum preparations are employed mainly against the housefly (**Musca domestica** L.) this insect seems to be the proper one to use for comparative tests of the pyrethrins.

To establish relative toxicity of the pyrethrins, it is essential that they be isolated in their pure, natural condition. A study of the active principles of pyrethrum flowers was therefore undertaken with the object of preparing the natural pyrethrins in a more convenient manner for comparative biological tests.

Extractives of pyrethrum flowers made with organic solvents always contain, besides the active principles, comparatively large quantities of extraneous substances, especially waxes, fats, and fatty acids. The preliminary steps in the purification, which have for their object the removal of these substances, have not been improved since the original method of Staudinger and Ruzicka[2] was published nearly 15 years ago. The simplification of this method, which is tedious and unsatisfactory, was the first step in the investigation.

It was found[1] that when petroleum ether extractives that contained about 30% of total pyrethrins, pyrethrin I and pyrethrin II being present in about equal amounts, were dissolved in acetic acid and the proper quantity of water was added, the waxes and fats were precipitated in such a form that they could be removed by filtration, leaving the pyrethrins, together with fatty acids and neutral impurities, dissolved in the acid solution. This material, after isolation from the acid solvent, could be freed from fatty acids by agitation in aniline solution with aqueous potassium carbonate. After separation from the aniline, the product freed from fatty acids contained 65 to 70% of total pyrethrins together with the neutral impurities.

To separate the two pyrethrins from each other, advantage was taken of an observation that pyrethrin II was more soluble than pyrethrin I in acetic acid containing a little water but was less soluble than pyrethrin I in petroleum ether. When a mixture of the two pyrethrins was agitated with a combination of these solvents, pyrethrin I together with most of the neutral substances tended to accumulate in the petroleum-ether layer, which separated from the acid layer, while pyrethrin II tended to accumulate in the acid solution. By repetition of the process on the fractions isolated from each solvent, the two pyrethrins could be separated from each other to a large extent and concentrates obtained in which each strongly predominated. The method was especially favorable for the concentration of pyrethrin II, concentrates containing 80 to 85% of pyrethrin II and 3 to 6% of pyrethrin I being readily obtained. The concentrates in which pyrethrin I predominated contained 40 to 55% of pyrethrin I and 12 to 15% of pyrethrin II.

Although numerous studies have been made of the relative toxicity of the pyrethrins, little attention has been paid to the measurement of their knockdown effect, even though this characteristic constitutes one of the leading merits of pyrethrum fly sprays.

(Continued on Page 10)

DIHYDROLIN

(Hydrogenated Rotenone Products)

CONTAINS

DIHYDROROTENONE

which has

*Double the Stability of Rotenone**

Increase the length of the toxic life of your sprays and at the same time effect a substantial savings with the use of Dihydrolin.

*Tests show Dihydrorotenone to possess *twice the stability* of rotenone in the direct rays of the sun.

Laboratory and exhaustive field tests have proven conclusively the potency and resistance to deterioration of Dihydrolin.

With the use of Dihydrolin, grade AA household insecticides may be manufactured at a savings of over 30% in the cost of your active ingredients. In addition to the decided *savings* you get *new insecticidal* properties plus more *stability.*

*Journal of Economic Entomology, Volume 26, No. 2, April 1933.

GREENHOUSE WHERE ENTOMOLOGICAL TESTS ARE CONDUCTED

DIHYDROLIN HI	DIHYDROLIN LS	DIHYDROLIN AG	PROTEXED*
For Household Insecticides	*For Livestock Sprays*	*For Horticultural Sprays*	Derris — Resins and Rotenone *For Agricultural Dusts and Sprays*

***PROTEXED** — Trade name covering our exclusive process for treating Rotenone in Derris and allied resins, chemically and physically for stabilization (protection of toxicity) against light and impurities found in inert bases.

For Further Information write

WHITMIRE RESEARCH CORPORATION

339 SOUTH VANDEVENTER · SAINT LOUIS · MISSOURI

WRC

DIHYDROLIN — MORIBUND KILL...

Once Down..Forever Out!

Experiments were therefore made to compare the knockdown effect of sprays prepared from each of the concentrates described above.[6] By employing a technique that measures both knockdown effect and the mortality of the flies, the sprays prepared from concentrates high in pyrethrin II had a greater knockdown effect than those prepared from concentrates high in pyrethrin I, although the pyrethrin I concentrate caused a higher mortality.

As Staudinger and Ruzicka[5] had shown that minor changes in the molecules of pyrethrins I and II destroy their toxicity to the cockroach, it seemed to be of interest to determine the effect on the toxicity to the housefly of pyrethrins in which the doubly unsaturated side chain had been reduced to a tetrahydro derivative by catalytic hydrogen.[3] Both the concentrates described above were found to have good knockdown effect against flies, and this effect was largely destroyed when the pyrethrins were subjected to mild catalytic hydrogenation. Hydrogenation also materially reduced the mortality caused by the pyrethrin I concentrate. The mortality caused by the pyrethrin II concentrate. was low and was not materially reduced by hydrogenation. However, the mortality caused by this sample was so low before hydrogenation that a marked reduction was not expected.

The hydrogenated pyrethrins used in the studies described above were obtained on mild catalytic hydrogenation of the pyrethrins. When the hydrogenation of the concentrates was prolonged, hydrogen was absorbed at a slower rate for a long time after the first more rapid reaction has taken place.[2] The first reaction involved only the saturation of the side chain of the pyrethrolone component. Cleavage of the molecule then took place. Pyrethrin I yielded tetrahydropyrethrone and chrysanthemum dihydromonocarboxylic acid, and from pyrethrin II tetrahydropyrethrone and chrysanthemum dicarboxylic acid monomethyl ester were obtained. The two acids were separated by steam distillation, the former being volatile with steam, the latter nonvolatile. The amount of each acid was then determined by titration.

Based on these observations, studies are now under way on a new method for the determination of the pyrethrins. To develop the reaction into a quantitative method a number of practical details remain to be worked out. The method has the advantage over the Seil method, which also determines the pyrethrins separately, that a determination can be carried out in much shorter time and, more important, that it is more specific for pyrethrins because cleavage of the esters by hydrogen with the formation of acid is not frequently encountered.

References

1. Gnadinger, C. B., 1936. Pyrethrum flowers. Ed. 2, chapt. 5. Minneapolis.

2. Haller, H. L., and F. B. LaForge, 1937. Constituents of pyrethrum flowers. VII. The behavior of the pyrethrins on hydrogenation. Jour. Org. Chem. 2:49-55.

3. Haller, H. L. and W. N. Sullivan, 1938. Toxicity of hydrogenated pyrethrins I and II to the housefly. Jour. Econ. Ent. 31:276-277.

4. LaForge, F. B., and H. L. Haller, 1935. Constituents of pyrethrum flowers. II. Isolation of pyrethrin II. Jour. Amer. Chem. Soc. 57:1893-1896.

5. Staudinger, H., and L. Ruzicka, 1924. Insektentotende Stoffe I. Uber Isolierung and Konstitution des wirksamen Teiles des dalmatinischen Insektenpulvers. Helv. Chim. Acta 7:177-201.

6. Sullivan, W. N., H. L. Haller, E. R. McGovran, and G. L. Phillips, 1938. Knockdown in fly sprays. Soap 14(9):101-105.

"He that falls in love with himself will have no rival."

The Necessity of a Changing World

By **J. J. DAVIS**, *Purdue University, Lafayette, Ind.*

EDITOR'S NOTE: *Presidential Address, Fifty-first Annual Meeting, American Association of Economic Entomologists.*

AS WE follow the trends in the world of science from year to year, we scarcely realize the progress being made or the changes taking place. We read of new discoveries, listen to reports of progress, and see gradual changes here and there, but perhaps they make little impression. It is only when we see the progress in spans of 5, 10 or possibly 20 years that we begin to realize the changes taking place and the advances being made. Such a situation applies to entomology perhaps more than to most of the other sciences.

In our annual gatherings in the past we have listened to statements by eminent authorities extolling the achievements of insects and emphasizing the present as the age of insects. Such statements have been definitely worth while in arousing mankind to a real danger and perhaps a potential catastrophe. And yet, when we recall that the science of applied entomology is scarcely more than 60 or 70 years old and note the progress in insect control during that time, we realize at once that man is gaining the upper hand. Well may we anticipate the time when chemical, electrical and mechanical warfare; insect-resistant varieties of plants and breeds of animals; and our farm and home practices, together with the aid of insects' natural enemies, will reduce insect control to a routine, just as the medical profession has reduced or practically eliminated certain diseases which were once responsible for the loss of thousands of human lives. But we must not be too optimistic, for without the continuation and enlargement of research, together with effective teaching and extension work, we may well predict a victory for the insects.

The Need of Continuous Research.—With the foregoing premise, perhaps we should first show the need for a continuation and enlargement of entomological research by reviewing the history of past problems. In looking back—and I intend to look back only so far as the past may enlighten our course for the future—we see notable achievements in insect control which have faded into insignificance because of changed conditions or factors for which man, in his changing moods, has been responsible. Perhaps a few examples will clarify our thoughts and explain why some insect problems may require many years of research and, even when essentially solved, should be followed with further research, just as medical problems are continually requiring newer or better or cheaper or more practical methods of dealing with ailments seemingly conquered.

The peach tree borer is an insect which has been a recognized primary pest of the peach tree from the earliest colonial days and one which has received much attention and study. Dozens of remedies were suggested and hundreds of chemical treatments tested, but nothing sufficed, excepting the laborious and unsatisfactory method of hand worming, until about 1920 when the almost perfect method of control with paradichlorobenzene was discovered. This is a case where continuous and persevering research over a period of more than half a century finally produced a reward which many times repaid all the costs of the research of the past. But even in the case of the peach tree borer, for which we now have an almost ideal insecticide, some workers are continuing their research to secure even better results, that is, safer, more effective, cheaper, simpler and more practical methods, that may be applicable under every conceivable condition which may develop.

An insect which occurs throughout the greater part of North America, and which has had an existence of major importance for many years, is the codling moth. When seeking support for codling moth research we are invariably questioned regarding the need of continual research on a problem which is as old as the apple industry and one which has received much attention from entomologists. Doubtless all who have maintained codling moth, or other long-time research projects, have been similarly questioned when seeking funds for continuation of such projects, especially those which have existed five or more years. But if we analyze each of these situations it is not difficult to show that we are not duplicating work year after year or failing to make reasonable progress, that the necessity for continued studies does not arise from the fact that we have found no solution; but that we are forced to continue research on major problems year after year because, with changing social, economic, legal and perhaps political situations, solutions for an insect problem that are all right one day may be quite the opposite in the near future.

Thus, in the history of codling moth investigations, there have been a number of stopping places where the research work could have been discontinued but for changed conditions, which made continuation of research not only desirable but imperative. In the early history of the codling moth problem, banding seemed to be the only control necessary, and later when arsenicals, especially lead arsenate, were introduced and orchard spraying equipment made available, one insecticide application, or two at the most, was sufficient to be fairly effective and to provide satisfactory control of this pest. The intensive growing of apples in favorable localities further increased the difficulties of the fruit grower, but perhaps the greatest impetus to more nearly complete control of the codling moth was the attitude of the public, for there came a time when buyers were willing to pay a price profitable to the grower only when the fruit was free from worm infestation. At about the same time grading standards, probably the result of public demand, emphasized the importance of worm-free fruits. Furthermore, in some regions where arsenicals have been used consistently, a greater percentage of the worms which had a resistance or tolerance to arsenic survived, again increasing the difficulties of the grower. All of these factors led to the necessity of more frequent and heavier applications of insecticides and the use of spreaders and stickers. Codling moth control had reached a high degree of effectiveness when the residue problem appeared in the picture and it became necessary to reverse the process and attempt to develop means of removing spray residue, intensify investigations to secure effective insecticides non-poisonous to humans to re-

place lead arsenate—the otherwise almost ideal stomach poison—to utilize means, other than chemical sprays, which we may call supplementary practices, and to better time our insecticide applications to minimize residue, reduce cost and secure more nearly complete control, especially of the first brood of worms.

Investigations on the use of fluorine compounds were at least temporarily halted by a tolerance placed on fluorine similar to the tolerance placed on lead and arsenic by the federal Food and Drug Administration. Fruit washing methods to remove spray residues have reached a high degree of perfection, but in general are practical only for the larger growers. Heavy and more frequent spray applications to destroy almost completely the first brood of worms have made it possible to cut down on later sprays, thus minimizing the residue problem. Progress has been made in the development of so-called non-poisonous sprays, especially in the case of the fixed nicotines, but certainly much more research must be done before a practical non-poisonous material will be available for the fruit grower in most fruit growing localities. Supplementary practices show marked value, and growers are already recognizing their use in actual practice. Much has been done to solve the codling moth problem, in spite of conditions and situations which seem to be continually changing, but because of these constant changes there has been scarcely a year or period of years, when we could consider the problem solved from the standpoint of the commercial fruit grower, and so with these constantly changing conditions, continued study becomes a necessity.

The European corn borer is a good example to illustrate the changes which may attend the control of an introduced insect. Its sudden appearance and conspicuous destructiveness, especially in Canada, aroused the public to the need for immediate action, but the problem was overplayed by demanding and securing the enormous sum of $10,000,000 from the federal government in an attempt at extermination. The failure of this costly experiment, which was anticipated by most entomologists, had a dampening effect on efforts to secure appropriations for much needed research. Fortunately, it was possible to continue research studies on a moderate scale even though the borer did no appreciable commercial damage in the states of the Central West previous to 1938. The effectiveness of complete coverage of corn stalks and the development of plow shields to accomplish this operation; the results obtained with time and rate of planting studies to reduce destructive borer populations; and the achievements in the development of hybrids and strains of corn resistant or tolerant to the borer were accomplishments resulting from this continuous research which warranted reducing corn borer investigation activities. Although not maintaining intensive research, entomologists have continued observations on borer trends from year to year, as already stated, and thus have traced conditions responsible for increase and decrease of spread and borer population and have followed the gradual transition to a two-brooded form as it moves southward, which is changing the situation completely so far as several of the control recommendations are concerned. These changes warrant reestablishing intensive research. Had we not maintained our observations and close contact with the corn borer over the past five or six years, during a period when the borer has not been conspicuous and had been forgotten so far as the public in the Central West was concerned, the changes which we have been able to follow would have materialized without our knowledge and would have presented a serious handicap for a continuation of research and extension. Certainly the small investment in following the borer trend has been insurance which has given large returns, more perhaps than we can ever evaluate.

Past experiences have demonstrated the danger which may result when lack of financial support interrupts insect studies, especially in the case of imported species. The discontinuance of appropriations for gypsy moth studies at a critical time is an excellent illustration. The necessity of uninterrupted studies over periods of years could be shown for perhaps all our principal insect pests, for certainly there are few if any insects responsible for major losses the control for which is so nearly complete and practical that further research is without profit. In fact, perhaps never, until an insect is essentially exterminated, will this situation exist.

Causes for a Changing Status of Insects and Insect Problems.—No insect is a static thing and no insect problem remains the same indefinitely year after year. Instead, each problem may be modified by changes in intensiveness of cropping, in cultural practices and in the varieties grown; through legislative and regulatory requirements; through changes in the demands of the consuming public; through changed and changing environmental conditions; and even by changes in the insect itself. We need only examine any one of the crop pest treatises 10 years after its publication to realize the

RASOLEUM

for your

INSECTICIDES

A New Product from our research laboratories. . . . MASKS that KEROSENE ODOR. . . . The odor that lingers is always pleasant.

WRITE FOR FULL DETAILS

Pfaltz & Bauer, Inc.

EMPIRE STATE BUILDING, • NEW YORK, N. Y.

NO-DOR

Kills—Rat Odors
Fish Smells
Garbage Smells
Sick Room Smell

A chemical deodorant which deodorizes all unpleasant odors due to organic decomposition.

many changes in control recommendations that have occurred during even that short period of time.

Here again a few examples familiar to all entomologists will remind us of the numerous factors responsible for the changed status of many insects and what we may anticipate for others in the relatively near future in this rapidly changing world. Native insects struggling for a meager existence on hosts which are themselves struggling for existence have found a "land of plenty" on introduced, cultivated, related plants and have become serious handicaps to plants theretofore relatively free from insect attack. The worn-out example of the Colorado potato bettle is perhaps best known, although many others might be mentioned, and we might go so far as to state that all insects feeding on wild hosts are potential future pests of cultivated plants.

As already indicated, changes in cropping systems or agricultural practices have resulted in "new" problems. For example, in northern Indiana, the acreages removed from cultivation, resulting in idle land allowed to grow up in weeds, have become breeding places for millions of tarnished plant bugs, and incidentally a favorable breeding and hibernating place for other insects. As the weeds mature and become less favorable for insect feeding, the bugs migrate to celery and potato fields, causing huge losses. Not only that but the insects are mature and very active, making the problem of control with insecticides practically impossible.

We know also of insects which transfer their activities to valuable property because of civilization activities. In the case we are thinking particularly of the termite, one of the nation's most destructive insects, although before the present modern civilization an insect which was beneficial, in that it lived in timbered areas and returned to the soil in the form of useful material dead woody plants. Strip farming, planting of shelter belts, reforestation of marginal land, introduction of new varieties of plants and breeds of animals, erosion control and a host of other agricultural activities, introduced with no consideration of their relation to insects, all play a significant part in our changing insect problems. An example or two may be appropriate.

In the reforestation program, extensive pine plantings have been made in the North Central states, resulting in the introduction and rapid spread of the pine shoot moth. Perhaps this could have been prevented had those promoting this project realized the insect factor and planned the project with the cooperation and advice of forest entomologists.

Again, we might refer to the conflicting viewpoints of wildlife enthusiasts, interested from the sportsman's standpoint, and persons interested in mosquito control from the standpoint of human health and comfort. Thus, we find the creation of numerous wildlife refuges close to the habitations of man. These and other projects resulting in the impounding of water have produced conditions favorable to the breeding of mosquitoes. On the other hand, much of the mosquito control work of the past few years has been unfavorable to wildlife. To accomplish the degree of mosquito control expected by the public, particularly in resort areas, and at the same time protect the breeding and feeding places of wild fowl, challenges the entomologist and the wildlife conservationist to develop new or modify old methods of procedure to serve both of these important purposes. Fortunately the changing public attitude, recognizing the necessity of mosquito control on the one hand and the new interest in wildlife on the other, has resulted in a definite effort by entomologists and wildlife conservationists to work out a harmonious program.

A major factor which has influenced insect problems is the notable higher standard of living which prevails. Beautification of homes as expressed by trees, shrubs and flowers has resulted in extensive plantings. Modern landscaping calls for many exotic plants, and with them new pests have been introduced and disseminated. Furthermore, soil disturbances during building operations frequently create abnormal and unfavorable soil conditions for such plantings, which reduces vigor of plant growth and increases susceptibility to insect pests.

Food standards might well be mentioned. I have already spoken of the insect conscious public which now demands worm-free apples resulting in the necessity of better control of the codling moth. Similarly, where once the housewife thought nothing of a bettle or two in the oatmeal, she now demands foods free from any visible insect or insect fragment, which perhaps is the major reason for the almost universal use of insect-proof packages for dried food products of all kinds. During recent years there has been a deluge of requirements under the heading of adulteration which includes visible insect fragments and excrement in canned and dried food products. Who knows but that the next logical step will be regulations prohibiting the sale of insect-infested fresh fruits and vegetables comparable with the present regulations dealing with processed products. And what about insect contamination of the increasingly popular frozen fruits and vegetables? All of these factors add responsibilities on the entomologist, for it becomes evident that more nearly perfect control must be our objective. While some regulations have stressed the need for more nearly perfect control, others have tended to discourage the use of some of our best insecticides through the use of which the degree of control demanded may be obtained. Needless to say I am referring to tolerance regulations on insecticide residues. It is not the intention to question or argue the justness of such regulations, but I do believe that much harm has resulted from undue publicity provided by federal and state officials, as well as that emphasized by manufacturers of so-called non-poisonous insecticides. So much emphasis has been given to the danger of insecticides that more and more we find federal, state, city and private specifications for insect and rodent control requiring the use of non-poisonous materials, when as a matter of fact the danger from the proper use of materials poisonous to humans is practically nil when in the hands of an experienced operator. For example, there is little basis for specifying the use of a non-poisonous material in a contract for controlling cockroaches in a building, when a fluorine compound will give better results and without danger if applied properly. My plea is that we give less stress in our publicity to non-poisonous preparations and instead emphasize the importance of correct use.

Living standards on this continent have changed and are continuing to change. Not many years ago we thought nothing of a bedbug or so in our hotel accommodations, and the lessee of an apartment gave little concern to cockroaches, silverfish or ants. Now we blacklist the hotel where we have encountered a bedbug, and the apartment renter is ready to cancel his lease if he observes a bug of any kind. The fact that hotels and apartments are now generally free from bedbugs and other vermin is the result of the demands of an insect-conscious public and the effective work of the pest control operator.

The present trend toward the centralization and regulation of agricultural activities by the federal government, including the control of crop acreage, crop surpluses, prices, etc., are certain to change insect problems and develop new ones which may tax the ingenuity of the entomologist to a greater extent than ever before. In reply to an inquiry referring to the above problems, addressed to the Secretary of Agriculture, I received under date of October 5, 1938, a very enlightening letter from the Honorable M. R. Wilson, Acting Secretary. The comments are so appropriate I am quoting the major paragraphs, as follows:

"In the early years of modern development of the science, what the farmers and the general public wanted from it was knowledge and direction that would both cut the cost of producing a pound or a bushel or a bale of farm products and at the same time increase the volume of production in any one year. There was then a market here or abroad, by and large, for all that the American farmers could turn out. It was wasteful of human labor to bring farm products part way to maturity and then see them serve the insect appetite instead of the needs of humanity.

"It is still wasteful to have such a thing occur. And the farm operators and the general public still wish economic entomology practiced so as to conserve labor and land resources and not waste them on growing food for insects. This is true in spite of the fact that the agricultural economic position has changed; that no longer is there a sufficiently increasing market for a constantly increasing output of farm products. This very change in the agricultural economic situation makes it more important than ever to keep down the costs of production through control of insect pests and by all other possible means.

"It is true that the present day trend is to avoid excessive output—but the preferred method obviously is to do this by adjusting acreage, not by surrendering crops in the field or stored products in the bin to insect pests.

"As a matter of fact, pest control is important in connection with crop adjustment. The only kind of production that can be efficiently regulated is efficient production. With acreage adjusted more nearly to the expected demand, the need for fairly stable yields increases. This puts an increasing premium on control of pests attacking the crops whose producers seek protection for price and income through the method of acreage adjustment.

"Likewise, the producers of the numerous crops which do not come within the acreage adjustment program find a growing need for efficient pest control. Competition in these crops is keen; marketing agreements and surplus-removal programs do not make things easy even for the most efficient producers. They must apply all means they can find of cutting down their costs of producing each bushel or pound of their crops.

"In brief, pest control becomes more rather than less important in the present economic situation in agriculture.

"Cooperative pest control is here already. Eventually, it may have some tie-up with the crop insurance program, which seeks to give insured farmers an incentive to take good care of their crops. Differential rates in crop insurance will encourage farmers in pest control through both individual and concerted action. It is plain, too, that the control of insects that attack stored prod-

ucts has increasing importance. The ever normal granary program, which provides for increased storage in the farm as well as in country and terminal elevators, directs attention to this problem.

"In farming it is necessary to harmonize technical progress with economic adjustment. Every branch of agricultural science, with entomology in the front rank, has some responsibility. There is no conflict between the technology and the economics of agriculture. Even when the market shrinks, there is no excuse for relaxing the control of pests and diseases. Many people think it strange that the technical branches of this Department should study how production per acre may be increased while the Agricultural Adjustment Administration emphasizes the importance of regulating supplies to the reduced demand. Actually, the readjustment of agriculture makes as heavy a draft on the technical as it does on the economic branches; it calls for the combined application of entomology, soil science, genetics, nutrition knowledge and economics in an extremely complex readjustment of the whole agricultural economy."

These comments from one who is interested in agriculture in its broadest sense and who is familiar with the present policies of the federal government, emphasize the importance of insect problems and signify above all the necessity of continued and enlarged research to meet the problems almost certain to develop with the changing agricultural situation.

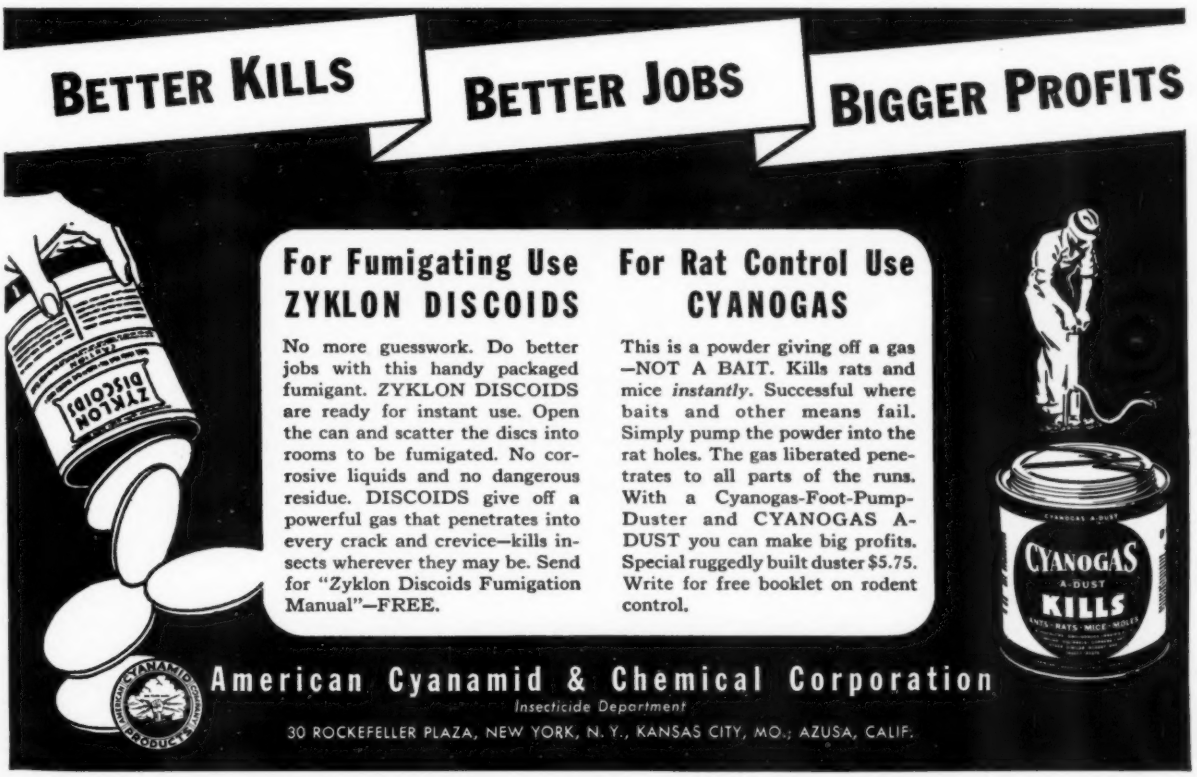
May we comment on and reiterate further the many new ideas and interests being exploited, as a direct and indirect result of the changed economic situations of recent years, which have been too often promoted without consideration of the insect problems involved. Reforestation, erosion control, the marginal land problem, water impoundment projects, wildlife conservation and control of surplus crops are among the problems referred to in which no consideration or insufficient consideration to insects has been given. For example, the storage of grain, in the ever normal granary plan, with concomitant control of pests, is one wherein the insects may play a major part. To be sure, perhaps more attention has been given to the insect problem in this than in any of the other newer projects, and yet in spite of the desirable features of the plan it is extremely doubtful if sufficient study has been given to facilities now available on the farm to insure safeguards against grain-infesting insects, or to the costs to the farmer of providing needed facilities.

Government Activity in Insect Control.—Some 75 years ago the decision was made that the federal government should make the promotion of agriculture a part of its concern. Economic entomology became a significant factor in the agricultural program and has grown phenomenally, largely because of the growth of federal assistance to agriculture. Until 1914 entomological work of both federal and state agencies was largely along the lines of research and investigations essential to the development of insect prevention and control. Extension Service as a definite project was made national in scope under the Smith-Lever Bill in 1914, and although the establishment of this service may be attributed to the success of cotton boll weevil demonstration activities, beginning ten years before, extension work in entomology did not develop as such to any great extent until within recent years. Without a doubt the inauguration of extension work, as a definite field activity in entomology may be considered one of the notable milestones in its applied aspects of the science.

Entomology has gone further. It has got into the big money with its so-called extermination campaigns. The campaign conducted against the Mediterranean fruit fly was apparently successful and well worth while. On the other hand the $10,000,000 corn borer extermination program resulted in a boomerang to the science of entomology. And yet this should not be attributed to an error on the part of the entomologists for this project was inaugurated and insisted upon by others than entomologists; in fact, it might be said that at the very outset the project was questioned and certainly not generally supported by entomologists.

A more recent development is appropriations amounting to millions of dollars to assist farmers in the control of such insects as the chinch bug and the grasshopper. We grant there are areas where federal aid was needed, but the lavish use of funds has resulted in some cases in affecting farmer initiative, one of the most valuable traits of man, and an expectation of aid for every problem that develops even to the extent of expecting aid in applying material furnished by the government. Undoubtedly the public is looking more and more to the government for insect control aid. We do not infer that federal or state aid is unwise in some instances, but we do believe that often such aid may be administered too freely and as a result delay progress in practical insect control. It is our belief that initiative on the part of the producer is essential in practical and efficient insect prevention and control and without it an increasing burden is placed on the official entomologist. The conditions I have just briefly related are bound to reflect on entomology as a whole and on the future necessary changes in entomological procedure.

(Continued on page 14)


BETTER KILLS
BETTER JOBS
BIGGER PROFITS
For Fumigating Use
ZYKLON DISCOIDS
No more guesswork. Do better jobs with this handy packaged fumigant. ZYKLON DISCOIDS are ready for instant use. Open the can and scatter the discs into rooms to be fumigated. No corrosive liquids and no dangerous residue. DISCOIDS give off a powerful gas that penetrates into every crack and crevice—kills insects wherever they may be. Send for "Zyklon Discoids Fumigation Manual"—FREE.
For Rat Control Use
CYANOGAS
This is a powder giving off a gas —NOT A BAIT. Kills rats and mice instantly. Successful where baits and other means fail. Simply pump the powder into the rat holes. The gas liberated penetrates to all parts of the runs. With a Cyanogas-Foot-Pump-Duster and CYANOGAS A-DUST you can make big profits. Special ruggedly built duster $5.75. Write for free booklet on rodent control.
CYANOGAS
A-DUST
KILLS
American Cyanamid & Chemical Corporation
Insecticide Department
30 ROCKEFELLER PLAZA, NEW YORK, N. Y., KANSAS CITY, MO.; AZUSA, CALIF.

Another activity as it affects entomology and related sciences is that organized under the Works Progress Administration. So long as WPA activities provide work to the unemployed, are administered for the benefit of the legitimately unemployed, concern a reasonably desirable project and do not interfere with legitimate business, we can find no fault. Thus the mosquito control projects, largely labor projects, can be supported under existing conditions. But let us step outside the field of entomology to illustrate our point of the undesirable features which may develop. We are thinking particularly of WPA rat control projects which have been sponsored in some cities. To spend hundreds of thousands of dollars distributing rat poisons and at the same time permit exposed garbage to accumulate in quantity, as I myself have seen in Chicago alleys, and even in the "Loop" district of that city, is a waste of money and interference with the legitimate business of the pest control operator. Had WPA money been properly used to clean up rat harbors, there could have been no objection, and much good would have been accomplished.

Political Activity and Its Effect on Future Insect Control.—In referring to political activities may I at once assure you that I do not refer to present American politics. Nevertheless, the trend in some countries is such as to warrant consideration of the problem here. Some have expressed a feeling that such recent developments as the ever normal granary plan may lead to requirements which may become political issues. However, at this time, in speaking of political activities, I have in mind such drastic policies as are being inaugurated and carried out in countries such as Germany, where we may expect a demand for the adoption of definite practices for insect control, and, what I personally fear most, the effect of such mandates on research and, as a result, a science so directed that results are predetermined. In making this statement I have before me the picture so wonderfully described by Eve Lipps in her book **Savage Symphony.** It is to be hoped that those who direct the policies of the United States and Canada may ever keep in mind the fact that any progressive science demands a free field for its activities and that we may never come to the point of demanding predetermined results or restricting unbiased scientific activity in any way, thus jeopardizing the future of world democracy.

Trends in the Major Fields of Entomology.—Unbelievable advances have been made in the various fields of entomology during the past 3 score and 10 years. New and unlimited fields of activity have been uncovered which may be attributed largely to changes in living standards and the attitude of the public. More and more the public is realizing that insects are a dominating factor in the destinies of life and is recognizing the need of commercial agencies for insect control. Thus, we find new fields opening up for those entomologically trained and opportunities for all interested in the subject, whether their interests be toward teaching, research, extension, regulation or business. But at the start we wish to insist that the prime requisite of an entomologist, regardless of the phase of work contemplated, is a real and sincere interest in the subject. We mention this specifically because there is an inclination on the part of many college students to major in entomology because of the possibilities of a job. In other words, there is an unfortunate tendency for persons to enter the field of entomology solely for financial reasons rather than because of their real interest in the subject. We do not wish to underestimate the importance of financial returns but we do feel that an interest in the subject itself should be a determining factor.

The field of teaching is perhaps the most vital within the scope of entomology, because achievements in the subject, to a large degree, are dependent on the development of men properly and adequately trained. As I view the situation, entomological instruction has become almost a "dead language," figuratively speaking. Teachers have recognized the need of providing service courses for branches of agriculture which have considered entomology an important phase of training for their students. The teachers of entomology have served well in this respect. They have recognized the need of developing men for research work and here again they have performed a notable service. But here they have stopped. They have not realized that, in spite of the additional opportunities in research laboratories of commercial concerns, there is slight or no increase in funds for research personnel in the federal or state agencies. Large funds are being made available for insect control operations, to be sure, but very little if any of this is available for fundamental or practical research. In other words, the field of research in entomology seems to have reached the point of saturation.

It is the duty of the teacher of entomology in schools where an entomological curriculum is provided to prepare students for an available as well as a profitable vocation. With possible exceptions, this they are not doing because they are preparing students primarily for technical research and have given little consideration to other opportunities, especially those which we may refer to as commercial. They have not explored the situation, or let us say the changing conditions, and not having realized the necessity of finding new fields of work for the students of entomology, they have not trained these students accordingly. Some of these new fields are being forced upon us. We can anticipate a future for those interested in extension entomology. Regulatory work will call for an increasing number of trained men. Insecticide manufacturers are calling for more men, not only for their research laboratories but for sales promotion work. There is an unlimited field for the commercial entomologist, and by this term I am thinking of consulting entomologists and pest control operators or pest exterminators. And yet there is perhaps no educational institution in the United States or Canada giving appreciable consideration to the development of men for such careers. Again I say that it is the duty of the teacher to consider these new fields and provide training to meet the new conditions if he is to continue to encourage qualified students to follow entomology as a vocation.

There is another obligation which the teacher should never forget. I refer to endorsements he may give his students. Because a student has received good grades and, let us say, shown promise in research, is no sign he will succeed as an extension worker or in the commercial field. Let us think of the pest control operator, or exterminator, as he has been commonly referred to in the past. The better pest control operators recognize the need of more training in technical entomology than most of them have received and some have employed men who have completed a major in the subject. Unfortunately not a few of the men employed have proved unequipped for such work, in spite of high endorsements. Consequently their employers have come to the conclusion that entomologically trained men are not qualified for the practical work of pest control. This is very unfortunate because we believe the commercial field of pest control is an important industry in which more well-trained entomologists should participate. In other words, we wish to leave with the teacher the thought that there is a variety of fields in entomology, suited for an equal variety of human personalities, and that recommendation should be made on the basis of qualifications for the type of work as well as qualifications in entomology.

Taxonomy, the very foundation of applied entomology, has made continuous advancement from early times. The early taxonomists were, with few exceptions, men and women interested in insects, for entomology was not their vocation. They were what we might call collectors or hobbyists. Today there are too few Says, LeContes, Harrises, Williamsons, Caseys, Pergandes, Schwartzes, Edwards, Cresons and others of their kind who devote their lives to insect study, not because of financial returns but because of their intense interest in the subject. To be sure, the museums of the nation are more and more developing the taxonomic side and are employing an increasing number of men and women qualified in this important field. Moreover, many men employed in teaching and research are doing excellent taxonomic work, but there is a decreasing number of taxonomists who are following this phase of entomology as an avocation.

There is a silver lining in this changing world, however, for the extension entomologists are building up rapidly a popular interest in entomology through the organization of 4-H insect clubs and as a result we may anticipate a revived interest in entomology as an avocation. We feel that this new interest, or may we say changed interest, is a hopeful sign. It is to be hoped that there will soon develop some Blatchleys who will provide for the use of these new recruits popular books on all the orders of insects along the understandable lines of the famous Blatchley book on Coleoptera.

In research we also see very definite trends. At present there seems little tendency to increase research either in federal or state set-ups in spite of the increased funds available for insect control work. Commercial organizations, however, are very definitely recognizing the importance of research with respect to the future development of business. With the many problems which must be solved, it is inconceivable that research activities will not be enlarged, even though perhaps not to the extent of the increasing number of men preparing themselves for this type of work. We must recognize that research is becoming more technical, and there is a greater intergrading of the sciences, necessitating more thorough and general preparation, which of course necessitates additional graduate studies. Teachers must recognize the necessity of more thoroughness, not only in entomology but in other closely related sciences.

Extension entomology has been slow in starting, as has already been indicated. But every entomologist realizes that the application of the results of research can be secured best by the extension specialist who has the qualifications necessary to "sell" the public. Thus we find, with the wonderful results being obtained by such specialists, that extension work in entomology is gaining endorsement and we may look forward to an activity of greatest importance in the future and, with this, greater use of the results of research.

The field of quarantine or regulatory work as it applies to insects is one which has made notable progress during the past 40 years but the future will witness changes and additions in keeping with changing conditions. Past experience indicates that

many state and federal laws have been too hastily drawn up to meet a special need, and in some cases laws are so broadly or loosely stated as to give unreasonable powers to governing body.

The advent of the San José scale was responsible for many state laws requiring the inspection and certification of nursery stock. These early measures were drawn up by each state with little consideration given to regulatory measures in other states. Recognizing the need of greater uniformity the American Association of Nurserymen and the American Association of Economic Entomologists, working together, worked out a "model" nursery inspection law, which has been the guide to practically all, if not all, present day state laws. As a result, nursery inspection has become an established and satisfactory fixture among the regulations dealing with insect control. Federal regulations, enacted to prevent the introduction of insects foreign to America, and to prevent or minimize spread of insects from one area to another, have been developed to a point where they too are providing a real service. Apiary inspection, to control bee diseases, is a service provided in most states, but rarely are funds available to protect the good beekeeper adequately. Therefore bee diseases are still important limiting factors in honey production.

Nearly 30 years ago, Congress enacted a law intended to regulate the sale of insecticides for the protection of the people. Several states have similar laws regulating insecticides for intrastate sale. Although these laws have rather effectively governed the marketing of some insecticides, such as the arsenicals, they have very definitely fallen short in protecting the public against many types of insecticides. There is activity at the present time to remedy these shortcomings, probably largely due to the great increase in the number of insecticides being placed on the market and the extravagant claims being made by some manufacturers. Regulations, most of which are federal, governing insecticide residues on edible food products and insect or insect-excrement contaminated food are moot questions. Suffice to say that the whole problem is one which needs far more study than has been given. Where insecticide or insect contamination is a detriment to health, such regulations are warranted but we would go back to our earlier premise, that laws of this kind should not be enacted hastily nor until they can be based on substantiated facts.

There is one additional type of legislative regulation which seems very essential in the near future to safeguard lives and more especially to prevent the functioning of impostor pest control operators, especially termite control operators, who are tricking the public and definitely harming the legitimate pest control industry. This is an industry which should be controlled by states and so far as we know only three states, California, Louisiana and Mississippi, have laws governing pest control operators, by which we refer to those who practice the commercial control of insects in hotels, apartments and other buildings. Many states have indicated the intention of enacting legislation necessitated by changing conditions. Our Association has a committee, working in cooperation with the National Pest Control Association, and it is to be hoped a model law, recognizing the essential fundamentals, will soon be available and that states will avoid hasty enactment of legislation.

Conclusion.—In the foregoing remarks I have stressed changing conditions which may increase the significance of insects and yet we should also realize that instead of increasing the importance of insects some changes may materially decrease their importance. For example, the reduction in the importance of the alfalfa weevil in certain areas may be attributed to the shift from range to dairy cattle. Such livestock require less hay, which results in earlier cutting of the first crop, thus preventing the completion of the first brood and in material reduction in weevil infestation.

I have brought to your attention problems and trends with which doubtless already you are aware. It has been my intention to emphasize them that we may keep them ever before us in our planning for the future to the end that we may not lose sight of the fact that entomology is a science of great importance in many, if not all, of the problems resulting from this changing world, and that it should be recognized as a factor which must not be ignored.

I have been critical in my consideration of these problems, not to condemn procedures which are familiar to all of us but to arouse interest in the necessity of having entomologists realize their responsibility and to point out problems for which the future entomologist will be answerable.

Correction

Inadvertently, in our March issue we mentioned that Dr. A. J. Cox was the fifth man elected to honorary membership in the California Pest Control Association. This should have been Glen V. Slater, Registrar of the California Structural Pest Control Board.

Join the ranks NOW of satisfied users of the

TOX-EOL SYSTEM
of TERMITE CONTROL

Over 150 Licensed Operators now use TOX-EOL with profit and satisfaction.

YOUR TERRITORY MAY STILL BE OPEN

The TOX-EOL SYSTEM is a combination of ground and wood treatment using chemicals which have been long and thoroughly tested with amazing results!

ODORLESS! STAINLESS! EFFECTIVE!

WITH THE
TOX-EOL SYSTEM
YOU CAN GIVE BETTER SERVICE!
SELL MORE JOBS!
MAKE MORE MONEY!
DEFY ALL COMPETITION!

FIVE YEAR WARRANTY BOND
Participated in by the manufacturer—available to one licensed Termite Control Operator in a community.
WRITE FOR COMPLETE DETAILS

GET OUR LOWER PRICES ON
PHOSPHORUS PASTE for Rodents and Roaches—RED SQUILL EXTRACT, Non-Poisonous Killer of Rats and Mice.
GUARANTEED ANALYSIS

CRE-O-TOX CHEMICAL PRODUCTS CO.
MADISON AT WILLETT **MANUFACTURERS OF PEST CONTROL CHEMICALS** **MEMPHIS, TENN.**

MOTHS

By **HOWARD E. JENNINGS,** *Chicago, Ill.*

EDITOR'S NOTE: *Mr. Jennings in discussing wetting agents and penetrants for moth proofing solutions at the Purdue Pest Control Operators' Conference prepared the following paper to provoke more serious consideration in connection with moth work.*

IN PRESENTING this paper let me point out the fact that this may be one of the milestones in our business progress.

A significant point has been reached when the technical men of the professional group actually co-operate with the men in our field to test and produce a new product for our industry.

Dr. H. I. Jones of Wilmette, Ill., is a member of the National Pest Control Association's Technical Committee, and his work on this problem has given us a product of definite value for our practical application.

Most of us will readily admit that moth proofing preparations offered to the industry have had one of several very definite disadvantages.

1. Instructions in regard to applications were often incomplete.

2. Claims were so great that the industry considered them to be "magic wonders," and did not accept them.

3. If sufficient chemical were applied on the basis of instructions given, the fabric was so saturated that it required several days to dry out, and therefore its application was often impractical or very difficult for people in our industry.

An instance of this is seen in the case of the instructions given by a certain manufacturers of a sodium silica fluoride moth-proofing preparation. His instructions call for "liberal spraying of the surface to be treated." Another manufacturer instructed the exterminator "to spray till thoroughly wet."

Now, gentlemen, it is your job to guess "how liberal is a liberal spraying" and "how wet is thoroughly wet."

Standard power spray nozzles can be set to deliver from approximately 2 oz. per minute up to several quarts per minute. And remember, if you guess wrong in setting these nozzles, your client's rugs are not going to be moth proofed and the manufacturer is going to refer you to his instructions, and tell you that you didn't spray enough to "wet" the fabric, or you didn't spray "liberally enough."

I believe exterminators are fundamentally honest and are willing to follow directions if those directions are definite enough to allow exterminators to follow instructions, but most manufacturers have been putting the guess-work up to the exterminator, and then writing him very nice but very sorry letters when the exterminator filed a complaint.

We should insist on accurate information for the use of any product we purchase unless we have the laboratory facilities to determine exact information for ourselves.

When we asked these same manufacturers to tell us the exact amount of their **chemical** that should be applied, they told us to use "3% of the weight of the wool to be treated."

Now the weight of the wool in an average 9 x 12 rug is 20 pounds. 3% of that is 6 tenths of a pound.

The chemical is listed as soluble in distilled water up to ½ or 1% but in actual practice we find that it is soluble in ordinary Chicago water to only about 4 tenths to 45 hundredths of 1%.

Taking the higher ½ of 1% figure, you can readily determine that it would take 3 and 77 one hundredths or about 3 and ¾ gallons of solution to treat a 9 x 12 rug with 20 lbs. of wool in the face. (30 lbs. of solution.)

Has **anyone** in this room ever used that much chemical to treat an ordinary 9 x 12 rug?

I find that under ordinary room temperature conditions it would take from four to six days for that rug to dry. And the manufacture says that the rug must be "dried thoroughly" before it is safe to walk on it.

Now, we can't ask our customers to give up their homes or apartments for a week while we do our work so we must either disregard the recommendations of the manufacturer or stop moth-proofing.

This problem has been answered by checking the solubility of other fluosilicates to find one that by its greater solubility gave a solution requiring less water in making the treatment, and therefore would require less drying time.

Magnesium silicofluoride seems to offer the greatest advantages in this group, although we are not taking the position that any product is the "best" or the final answer in this field.

Various answers as to the solubility of this fluosilicate indicate how little research had been done. We found various commercial magnesium fluosilicates offered with almost as many different apparent solubilities.

One manufacturer's product was less than 25 hundredths of 1% soluble. Another was indicated to be 20% soluble while the Siedels laboratory manual showed it to be soluble up to 657 parts per thousand.

Still another has reported a solubility of 38% for a product which he prepares.

It can readily be seen that with greater solubility of the chemical, we could strive for greater protection and still stay within practical limitations as to the amount of water used in getting adequate protective treatment.

However, it was found that using less water introduced a new problem. It did not allow us to get treatment down to the **base** of the fabric.

The factor of pentration was lost due to the physical limitation of the less amount of water used.

The seriousness of this problem became apparent when the following test was made. The surface of the test carpet was sprayed with an aqueous solution to an extent that would give 3% of chemical in weight of the wool treated.

The solution was colored with a blue dye to watch the penetration into the white pile used in the test.

Thus the surface was colored to the extent of the actual penetration of the chemical and it was readily seen that lack of penetration resulted from the use of a less bulky solution.

The idea was fine except that it just didn't work.

Turning to the experiments that had already been done by men in textile chemistry, we found that they had solved similar problems by the use of various so-called "Wetting agents" or "fabric penetrants."

Quite an imposing list of these were available and in testing them we ran into new difficulties—some of the wetting agents required hot water solutions which caused shrinkage of the fabric. Others affected the "handle" of the wool, leaving it harsh to the touch. Others were too expensive to be considered, of the group that did seem to answer the problem of penetration at low cost without affecting the shrinkage or "handle" of the wool, most of them were found to be incompatable with the silicofluoride to be used as the moth proofing agent.

This is demonstrated in solution 1.

The chemical used for moth proofing has been precipitated out by the chemical reaction with the wetting agent. However, one was finally found that did not precipate the fluoride.

In order to judge the penetrating quality of finished product a simplified "Draves Test" was used.

The Draves test is based on a tabulation of the time in seconds required for a standard 5 gram skein of yarn to sink in the solution.

The Draves test was used in preference to the Du Nouy Tensiometer since it was considered that the efficiency of the wetting solution was based not only on the reduction of surface tension of the solution but also upon the reduction of the interfacial tension between the fabric face and the liquid.

In applying the Draves test standard "U" knots were used instead of skeins of yarn since they more nearly represent the true conditions of fabrics to be treated commercially.

Practical demonstration of the effect of adding the penetrant to the moth proofing solutions can be seen by comparing the depth of penetration of the spray containing the wetting agent and the dye with the depth of penetration of the spray without the wetting agent.

A further check by the modified Draves test shows the comparative rapidity of the penetration. It may be noted that under comparable conditions the yarn is not penetrated without the addition of the penetrant or wetting agent because the yarn does not "take up" a sufficient amount of the solution to make it lose its buoyancy.

A demonstration then followed after which questions were answered.

Moths Invade Dodge City

Traffic Is Tied Up and a Train Is Delayed Fifteen Minutes

Dodge City, Kans.—A cloud of moths almost darkened the sun at noon here recently.

Millions of the insects tied up traffic and sent churchgoers hurrying inside. A Santa Fe train was delayed fifteen minutes while trainmen scraped crushed moths off the slippery rails.

"Growlers do not grow in grace."

Unusual Pest Problems

Conducted by

PROF. J. J. DAVIS, *Purdue University, Lafayette, Ind.*

(NOTE: *Every pest control operator has had and will continue to encounter unusual problems. Even though they may be of little immediate significance, it is highly important that the operator be able to diagnose the problem and provide an intelligent answer. Many such problems have been called to my attention during the past two years and it is my intention to provide each month in this column, one or possibly two such problems. We hope to hear from operators who have experienced unique or unusual problems. Will you not send us your notes, or better, write a short account of some unusual experience. Specimens should be submitted, if possible, to insure the correct identification of the pest in question. J. J. Davis, Purdue University, Lafayette, Indiana.*)

No. 3. Refuse Dumps as Breeding Places for Crickets and Sowbugs.

At the request of city officials, I was called to assist in determining a procedure to control sowbugs and crickets **(Gryllus domesticus)** which were breeding in a 30-acre city dump and migrating into residences adjacent to the dump in enormous numbers. Not only were they a serious nuisance to the residents of the neighborhood, but in addition the crickets were doing considerable damage to clothing.

A careful inspection of the dump did not reveal other organisms in sufficient numbers to warrant control measures, so that our problem was confined to control of sowbugs and crickets.

The problem seemed to be three-fold: (1) Check imigration; (2) Effect a control at source of infestation; (3) Control of the pests in homes where they had migrated. The first two problems might have been solved by firing the dump, but this was not considered advisable because of the close proximity of buildings. After reviewing the available literature it was decided to dig a shallow trench around the perimeter of the dump which was filled with an inexpensive asphalt compound to check migration. This was not effective 100 per cent until after several days, since the pests were migrating in such large numbers that they soon filled the trench permitting others to cross over the bodies of their less fortunate allies. The next step was to bait the dump with poison bran bait, using 500 pounds for the first and only application. Test bottles set on the dump showed 100 per cent kill of sowbugs and 90 per cent of crickets. Casual observations did not reveal spectacular results, although a close examination revealed large numbers of both pests dead under paper, stones and debris. For certain reasons continued use of poison bait was not possible. However, continued applications of asphalt in the trench proved effective in stopping the migration from the dump into homes.

Control in homes was affected by the liberal and thorough use of contact sprays and sodium fluoride. The latter was used in the basements and outside the buildings at all possible points of entrance, such as basement windows, area-ways, first floor doors, etc. This treatment was surprisingly effective although a share of the results are attributed to the similtaneous use of contact sprays in the basement, and first and second floors.

R. M. ADAMS,
Allen Chemical Company,
Cincinnati, Ohio.

(Note: Mr. Allen suggested that better results might be obtained by using poison bait in the trenches surrounding the dump in place of asphalt. Our own experience would confirm this suggestion. The trench should be plowed or dug deep with the steep side on the outside. The use of the poison bran bait should be applied daily in the trench as long as the pests are migrating. Also our observations indicate that poison bran bait broadcasted over the dump could be highly profitable. Crickets were unusually abundant in city dumps throughout the south central states. Although the previous winter was mild we cannot say that this was the factor responsible for cricket abundance.—Prof. J. J. Davis.)

$30,000 Asked for Spider Bite

Oakland.—Charging she was bitten by a black widow spider while attending a local motion picture theater in August, 1937, Miss Mae Pearson, Berkeley, filed a $30,000 damage suit. She alleged the insect's bite incapacitated her for many months.

Lethane 384 Special

The Synthetic Insecticide Concentrate

LOW COST
HIGH KILL • NON-CAUSTIC
PLEASANT ODOR

For things that crawl or fly

SPRAYS made with Lethane 384 Special are noted for their high killing power, fast action, their economy and their lack of objectionable odor.

Use Lethane 384 Special as the sole toxic agent in your general pest control sprays.

RÖHM & HAAS COMPANY, INC.
222 W. Washington Square
PHILADELPHIA, PA.
CHICAGO • KANSAS CITY, MO.
Canadian Agent—P. N. SODEN & CO., LTD., MONTREAL, P. Q., CANADA

The Termite Operator

By JOHN L. FARLEY, *Oakland, California*

EDITOR'S NOTE: *A timely discussion of fundamentaals that make up a part of the termite control operators attitude was ably presented by John F. Farley, of Oakland, California, as he spoke at the Second Annual Pacific Coast Pest control Operators Conference held last February at the University of California. Mr. Farley, specializing in termite control work, has in a practical sense combined a series of questions with inferred or direct answers which makes his paper especially worthy of publication.*

WITH ALL due respect to the outstanding discussions which have preceded and which will follow mine, and with all due deference to the splendid men of science who have so generously shared their knowledge with us, we will now consider the most important subject in the whole conference. We can learn all there is to know of these other subjects, but if we are not fundamentally right ourselves, we cannot make a respected profession of our business.

This discussion will be based upon certain basic assumptions on which we must agree if we are to avoid controversy as to details. Let us assume that the methods and materials represented by each of us will, if conscientiously used or followed, repair damage already done and will give the desired protection from future damage. The extent and duration of the protection, must of necessity, vary with the kind of termites we are dealing with and the economic value of the property. But whatever qualifying conditions, we will assume that our work, our materials and our methods, all honestly applied, will give full value and the required protection. We can now consider some of the other aspects of our problems without personal bias or animosity.

Without regard to relative importance, let us now consider some of the situations which we all face. Bear in mind that I shall not attempt to supply you with all the answers, nor do I pose as one who always has and gives the right answers. I merely wish to direct our attention to certain matters in order that we may give them careful thought, and having thought well, we can do better.

What are we to do about spot or local soil treatments? Should we ever recommend them? Should we do them? We are considering highly localized infestations as indicated by our inspections. If an owner is entirely willing to accept our recommendations, and without regard to our own profit, what should our recommendation be? If such local or spot treatment is a success, we have saved an owner some money. If it is a failure, even though no material added damage results, probably some other operator will finish the job which we started. Who knows what old root system may extend from the obviously infested areas to other sections of the house.

Closely related to this same subject is the matter of partial jobs. These we will assume occur when a property owner wants or can only do, the minimum amount of work which must be done right now. In accepting such work, even though we may have recommended a complete job, the owner soon forgets, and only remembers that the Blank Termite Company did his work and he now has more trouble. Very likely it will cost him more to complete the job than if it had been done originally. In these days when it is so easy to obtain loans for property improvement there seems to be little reason to defer necessary property protection, and it seems that we should be most reluctant to yield to pressure for partial jobs. If we must yield, we should make certain that the owner understands the limitations of our work, and that this understanding is in writing. These partial jobs do not meet the real needs for the care of the property and will all too frequently bring discredit to individual operators and to the industry as a whole.

In the above discussion I have left out the problem of competition which too often drives an operator to do less than the required work in order to get a job on a price basis. Such practice can never be condoned.

Another situation arises when an owner is about to sell and wishes to do the absolute minimum of work necessary to dispose of the property, as contrasted with the owner who wishes to buy future protection. Shall we do a temporary or second class job? Are we to admit that we do two classes of work? How will our good customers

SODIUM FLUORIDE

FLUOREX V
POWERFUL INSECTICIDE

PYRETHRUM
POWDER and EXTRACT

GENUINE RED SQUILL
POWDER and EXTRACT

ARSENATE OF SODA

ARSENITE OF SODA

QUALITY GOODS

•

American Fluoride Corporation
151 West 19th St. New York, N. Y.

SOLVAY
TRADE MARK REG. U. S. PAT. OFF.

PARA-DICHLOROBENZENE
. . . *for MOTHS*

ORTHO-DICHLOROBENZENE
. . . *for TERMITES*

• **Available for quick spot shipments from over 100 stock points!**

In the rush season, delays hamper operations and cost you money! Solvay distribution service on Para-dichlorobenzene and Ortho-dichlorobenzene is available from over 100 stock points and branch offices . . . making sure that your orders are promptly filled and sent to you *without delay*. Write or telephone to the nearest branch office listed below or to

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 Rector Street New York
Branch Sales Offices:
BOSTON CHARLOTTE CHICAGO CINCINNATI
CLEVELAND DETROIT NEW ORLEANS NEW YORK
PHILADELPHIA PITTSBURGH ST. LOUIS SYRACUSE

know which class of work they are getting? Or should we do two classes of work to meet the different situations? Considering the kind of building, its location and probable useful life, should there not be just one class of a termite job which we would all apply? Are we risking our reputations, and are we helping to bring discredit to our industry when we attach our names to anything less than a good job.

We hear the answer that if we don't do it, some other operator will. That is true in all professions. It is not a case of—"Can we afford to let the poor jobs go by?" but rather a question of—"Can we afford to do them?" That same man with whom we have connived to help him sell his property, may later desire some work done on property he wishes to keep. Will he still come to us?

Now that many general contractors are taking a renewed interest in termite control work there is an increasing demand for certificates or clearances from licensed termite operators for work done by unlicensed contractors. What should be our attitude? If some other contractor has done the obvious work which is necessary, should we give the certificate for the inspection charge? If we give approval to the work, does it become one of our jobs? Can we make a proper inspection if some one has gone through and removed all evidences of infestation? If we accept such inspections should we charge more? Is our inspection really conclusive as to the effectiveness of the control work; or should we insist on doing, and include in our charge the cost of a follow up inspection similar to that we do in our own work? Are we in the position of a licensed physician being called in to certify that an unlicensed practitioner had effected a cure?

We are all familiar with the FHA requirement of a certificate that a building is FREE from termite and fungi damage or infestation. Can we honestly furnish such a certificate except in the case of new buildings outside the kalotermes areas? Even with very accessible sub-floor areas, can we always find those hidden infestations where termites enter from the outside between stucco coat and the foundation, or through small cracks in brick veneer—even when the foundation walls are amply high. Should our certificate be in terms appropriate to the situation and state that "no evidences of infestations were found," or "to the best of our knowledge and belief the property is free"—etc.? We must also be particularly cautious of inaccessible areas and specifically exclude them from a general certificate.

Next I would like to consider a few other matters relating to our inspections. Does our appearance, or that of our inspectors, tend to create confidence in our work? How shall an inspector dress? We have the extreme of an operator reporting for an inspection so well dressed that the owner doubts his willingness to explore the difficult and dirty corners under the house; and we have the inspector who goes from one dirty inspection to the next in clothes so unpresentable that the householder fears he is a tramp. The exact answer to the problem of clothes depends upon local conditions and individual circumstances but I believe we must consider carefully the effect of the contact made by the inspector, and remember that this contact, even though involving dirty work, must be in keeping with our desire and need to be recognized as professional men.

In making an inspection we frequently find old termite workings which have been abandoned. Perhaps they are the only signs of an infestation on the property. How shall we report them? Can we certify that the property is free of evidence of termite activity? Is it fair to a seller to report such a situation as an infestation? Is it fair to a buyer not to report it? Does the statement that "No active termite colonies were found" imply more than it should? Or should our rule be to consider all evidences of termite activity as infestations unless we have positive knowledge that corrective measures have been taken. In that case what should we accept, or what should be our test of their adequacy.

What kind of an inspection report shall we submit? Should this report tell by word and picture where the infestations occur and what remedial action should be taken, together with our estimate of the cost? Is there danger in furnishing a thorough report that an owner can shop around and get the work done to our specifications by some one else? Or in spite of this, should our reports indicate or suggest the thoroughness with which we do our work? In any event, our report must be something distinctly superior to the report which an untrained handy man will submit.

Now as to the estimated costs. Right here is one of the best indications of just what we think of ourselves and our work. Just so long as we are so concerned about cheap competition that we do cheap jobs, just that long will we think of ourselves, and have the public think of us as glorified handymen instead of members of a skilled profession. Good termite control requires thorough work, skilled labor, quality materials and lots of supervision and follow

LET LLOYD'S OF LONDON INSURE YOUR MOTHPROOFING JOBS

INCREASE YOUR MOTHPROOFING BUSINESS
WITH THE INSURED MOTHPROOFING COMPOUND

"MORTOLIN"

"400" Pest Control Operators Cannot Be Wrong:

And Why? . . . Because every job completed with "Mortolin" by the professional mothproofer is covered by an insurance policy of $2,000, issued by Lloyd's of London, the largest insurance company of its kind in the world.

"MORTOLIN" is

1. *A killer, repeller and MOTHPROOFER.*
2. *Oil Soluble.*
3. *Non-poisonous.*
4. *Odorless.*
5. *Highly concentrated.*
6. *Economical.*

This product has been marketed for over eleven years with competent results.

Act Now—Write For Details

ASSOCIATED CHEMISTS, INC.
6243 SOUTH ASHLAND AVENUE
CHICAGO, ILLINOIS

up. Let's do and use these things and charge sufficiently so that there is neither necessity nor temptation to slight any of the essential details. We may miss jobs here and there on a price basis, but each job we do will be a recommendation for another to those who really want termite protection.

We must remember that substantial charges should preclude amateurish work. Our mechanics must get as much satisfaction out of having interior and seldom seen structures just as plumb and true as if they were ornamental exteriors. If we do our work in an exact and professional manner, if we are clean about our jobs, and our workmen personally clean, and if our equipment is well kept up, we can elevate our occupation into the class of a profession. We are not selling hours of labor and units of material. We are selling termite protection. We are doing professional work and rendering professional services.

As yet I have made no mention of advertising. It frequently is our initial public contact. Is it dignified or is it full of meaningless words and promises? Does it invite the customer who is primarily interested in quality work, or does it lure the man who likes to shop around? Which kind of a customer do we wish?

In reviewing the things which we have just been considering, it would almost seem that we have been thinking about a code of ethics. We have such a code up for consideration. It should not be considered as a well arranged group of pleasant sounding words, but a guide for professional conduct, something we are capable of following and something which we have a real desire to follow. Let's adopt such a code, believe in it, and live it. Let's think of ourselves in professional terms, let's make our contacts and do our work in a professional manner. Let's believe thoroughly in ourselves. Then we may expect professional rewards and get the satisfaction of rendering a real community service.

Red Squill

Owing to confusion that prevails as to lethal dosages of red squill powder and references made frequently in terms of the metric system Dr. F. E. Garlough of the Denver Laboratories of the United States Department of Biological Survey and G. C. Oderkirk of the Experiment Station at Lafayette, Indiana, worked out a brief statement showing the comparison of grains of red squill powder per pound of rat with milligrams of red squill powder per kilogram of rat.

	Avoirdupois or U. S. System			Metric System		
Strong	1 grain	per	pound	143 mg	per	kilogram
	2 grains	per	pound	286 mg	per	kilogram
	3 grains	per	pound	429 mg	per	kilogram
Fairly Good	4 grains	per	pound	572 mg	per	kilogram
Very Weak	5 grains	per	pound	715 mg	per	kilogram
	6 grains	per	pound	858 mg	per	kilogram
Too Weak	7 grains	per	pound	1001 mg	per	kilogram

Suppose that the average rat weighs 10½ oz. (298) grams.) and you have a 3 grain (429mg/kg) red squill powder and you wish to determine the correct lethal proportion of red squill to the bait material. A bait should be made so that there is a lethal dose of red squill in each gram of bait due to the fact that a rat will normally eat at lease one gram of poisoned bait at a feeding. To have a lethal dose of a 3 grain red squill there should be 2 grains of squill on each 15.4 grains of bait. The latter dose amounts to 2 oz. of red squill per 1 pound of bait or 1 pound of red squill per 8 pounds of bait (weight of added water not included).

Let us now suppose that we have a 5 grain/lb. (or 715 mg/kg) red squill and the correct lethal proportion is desired. We will again assume the average rat that we will kill weighs 10½ ounces or 298 grams. To have a lethal dose of a 5 grain red squill there should be 3.28 grains of squill on each 15.4 grains of bait. The latter dose amounts to 3.4 ounces of red squill to 1 pound of bait or 1 lb. of red squill to 4.17 pounds of bait (weight of added water not included). A bait containing such a high concentration of the red squill is likely to be rejected by most rats. Thus, it is advisable to use red squill powder with a toxic strength of 1, 2, 3, or 4 grains per pound of rat.

NOTE: 1 grain = 64.8 milligrams.
2.2 pounds = 1 kilogram.

Diet Affects Hair

Wooster, O.—Diet may control the color of human hair to some extent, a nutrition expert told delegates to the Ohio Academy of Science session. Dr. Charles Hunt, associate in nutrition at the state agricultural experiment station here, said omission of vitamin B-6 in feeding of rats had caused gray hairs. Feeding it in liberal quantities, he said, restored the hair to its natural shade.

"What e'er is begun in anger ends in shame."

FLU-MOUS-DED
[THALLIUM]
IN SEED FORM

FLU-MOUS-DED—color sprinkled canary seeds. PREPARED BY OUR NEW EXCLUSIVE PROCESS WITH THALLIUM SULPHATE of the highest toxicity, 100% TASTELESS AND ODORLESS. In contrast with Arsenic, Strychnine or Phosphorous, the lethal dose of Thallium is 5 mgm. per mouse, the highest toxicity in any rodenticide.
The great demand for our product and our high efficiency in processing enable us to announce a substantial price reduction.
10 lbs. min. $2.60 25 lbs. $5.75 50 lbs. $11.00 100 lbs. $20.00

FLU-ANT-DED
[THALLIUM JELLY-HONEY FLAVORED]
A QUICK ACTING NATIONALLY KNOWN ANT KILLER

FLU-ANT-DED in traps, tubes and bulk remains unchanged by climatic variations north, south, east or west. Will not separate or crystalize. Only highest test Thallium used.

PRICE LOWEST QUALITY HIGHEST KILL SUREST

FLU-RAT-DED — Prepared—Ready to use—Thallium Rat Bait

Terms: Cash With Order F. O. B. New York

F. LUCAS • 174 West 65th Street • New York, N. Y.

Announcing
A New Bulb Market for You

Many householders do their own service work. Since you can't sell 100% of them service, you can sell them the "makings." Help yourself to a new source of easy profit by selling them a New Centro-bulb Jr.—a 4-oz. bellows having all the features of the large professional Centrobulb.

1. Heaviest metal nozzle with deep cut thread.
2. Largest opening for easy filling.
3. Stay tight screen to avoid clogging.

Write for our surprisingly low prices and start making these extra profits at once.

Central Rubber Products Co., Inc.
821 Broadway New York, N. Y.

LOCAL ORGANIZATION NEWS

Indiana Operators Meet

Following a local meeting of Indianapolis P. C. O.'s and a later conference with a committee of the Indianapolis operators, J. J. Davis called a get-to-gether meeting of all Indiana operators at Purdue University, Lafayette, Indiana, April 1. A group of thirteen enthusiastic operators and three purdue entomologists attended. The participants included E. H. Arnott, Arnott Exterminating Company, Indianapolis; Maurice Bailie, South Bend Exterminating Company, South Bend; E. E. Edwards, General Exterminating Company, Indianapolis; J. R. Franklin, Hammond Exterminating Company, Hammond; H. H. Gaddis, H. B. Jordon Company, Indianapolis; George T. Hunter, Fort Wayne; John F. Knapp, Murko-Wan System, Indianapolis; Bert Lewis and Mrs. Bert Lewis, Lewis Termite Control Company, Muncie; Jason E. Nicholas, Reliable Exterminating Company, Indianapolis; C. O. Partlow, Reliable Exterminating Company, Layfayette; Michael Pawlowski, South Bend Exterminating Company, South Bend; D. B. Wilson, Monroe Exterminating Company, Gary; also J. J. Davis, H. O. Deay, and G. E. Lehker of Purdue University.

The value of informal and organized regular meetings was discussed by all present. It was felt that such meetings would develop a closer cooperative attitude, and result in a better and higher type of service to the public. Much time was given to a discussion of problems of Indiana operators, promoting public confidence in reputable pest control operators and plans for the future.

It was agreed, by consent, that meetings be continued, to be held at Purdue University, Lafayette, Indiana, the third Saturday every other month, the next meeting to be held May 20. It was also decided that two topics be discussed at each meeting, one dealing with a specific insect problem and one with an industry problem. The meetings will start at 10:00 in the morning, the insect problem to take the time from 10:00 till noon, and the industry problem the afternoon session. J. J. Davis was asked to act as the presiding officer until a state organization is decided as a desirable procedure. It was the consensus of opinion that a state organization was not desirable until after several informal meetings to insure a need and support of a state association.

Topics to be discussed at the May 20 meeting include Termites, with E. G. Lehker as the leader, and Cost Accounting, E. H. Arnott to be the leader.

All present were enthusiastic and assured their continued participation in the bimonthly meetings. With 50 per cent of the known established operators in Indiana present at the initial meeting, success of future meetings seems assured.

Associated Exterminators and Fumigators of New York

The regular monthly meeting of the Associated Exterminators and Fumigators was held at the headquarters, 7 East 44th St., New York, on Tuesday, April 18th. President William O. Buettner presided and outlined briefly the work being done by the various committees in connection with the Seventh Annual Convention of the National Pest Control Association to be held at Hotel Pennsylvania, October 23-24-25.

Several guests attended the meeting, remaining over from a special national meeting which was held during the afternoon. Charles W. Houghton, of Boston, brought the greetings from the New England Pest Control Association and told of the activities of the group in conducting a course. F. H. Bohman, of Hartford, Conn., brought greetings from the Connecticut Pest Control Association which has recently completed a series of interesting educational meetings. Both Mr. Houghton and Mr. Bohman are presidents of the respective associations and in addition the former is regional vice president of the national, while the latter is one of the directors. Martin Meyer, another director of the National Association, from Philadelphia, spoke of the plans on foot for transportation and travel. Calvert Cissel, general chairman of the convention committee came from Washington, D. C., and outlined briefly the entire program and assured the local group of all the cooperation possible from the National Committee. William J. Shrimplin, as local chairman, responded to the greetings of the

(Continued on page 22)

FIFTIETH ANNIVERSARY McCORMICK

The Finest Milled Pyrethrum and Derris Powders in the World

McCORMICK PYRETHRUM POWDER: Has a known high pyrethrin content. Milled to microscopic fineness—contains more killing particles per ounce—remains suspended in the air longer. More effective and economical because it comes into more intimate contact with the vital parts of the insect's body.

McCORMICK DERRIS POWDER: Also milled to extreme fineness. Standardized at 4 % and 5 % rotenone. Suitable for use in derris dusts when combined with a carrier, or in aqueous suspension sprays. Will not clog spray nozzles.

Other Derris Derivatives

DERRIS EXTRACT: Contains 5 grams of rotenone per 100 cc. plus the other toxic derivatives of derris root.

DERRIS EXTRACT (Dry): Consists of 25 % rotenone and 75 % of active resins.

ROTENONE CRYSTALS: Solvate, a white crystalline product, 71 % rotenone.

For further information about these products address:

The McCormick Sales Company
BALTIMORE, MARYLAND

In Canada, McCormick & Co. (Canada) Ltd.
454 King Street, West, Toronto, Ontario

LEADING FUMIGATORS

ARE ADOPTING

ACME *FULL VISION*

Acme Full Vision Gas Masks, equipped with Acme Type HCN Canisters, are rapidly being adopted by scores of the largest fumigators and gas mask users in the country.

FULL VISION, an exclusive Acme feature, affords the wearer unobstructed vision, and provides greater safety and efficiency.

Write for Folder M387 on Acme Canister Masks.

Acme Protection Equipment Co., Inc.
Manufacturers of Respiratory Protective Devices
3605 Liberty Ave. Pittsburgh, Pa.

visitors and pledged the complete support of the New York City industry to make the Big Seventh the best yet.

The speaker of the evening was Kenneth Harder of Hempstead, Long Island, who spoke on the subject of "Termite Control," stressing in the main the ethics that go into gaining respect on the part of the public as termite control measures are discussed with prospective customers. The meeting was then opened for general discussion on termite control and several members took an active part contributing ideas from their experiences. Among those taking part in the discussion were Chester Schwimmer of Fumex Sanitation, Lothar Vogel of Termite Control Co., Kenneth Tompkins of Bliss Exterminator Co., I. A. Levine of Pioneer Exterminating Co., Sidney Wimmer of Majestic Exterminating Co., and others previously mentioned as taking part in the program.

Committees for the present year were announced by Secretary W. J. Parker:

Officers and Directors

President, William O. Buettner; 1st Vice President, A. W. O'Connor; 2nd Vice President, Murray Gladstone; Secretary-Treasurer, W. J. Parker; Directors: S. S. Rosen, J. J. Pero and M. M. Horwitz.

Committee on Finance: Justin Simon, Chairman, Ray Smith, Henry Mahler.

Committee on Health Department and Legislation: Eugene H. Sameth, Chairman, M. E. Blinder, P. J. Kelley, Sidney Wimmer, M. M. Horwitz.

Committee on Ethics and Fair Trade Practices: William J. Shrimplin, Chairman, A. Ralph Greene, Herbert Meyer, E. N. Goldey, George Sanders.

Committee on Membership: Murray Gladstone, Chairman, J. J. Pero, E. M. West, Harry Rosenfeld, M. I. Breecher.

Committee on Publicity: J. J. Hess, Seymour Bayer, C. H. W. Hasselriis.

Committee on Constitution and By-Laws: Col. L. Philipp, Chairman, Albert Calderon, Irving Drucker.

Committee on Advertising Code and N. Y. Better Business Bureau: E. J. Jennings, Chairman, W. J. Shrimplin, Herbert Meyer, Philip Haller, William A. Elliott.

Committee on Grievances: No definite personnel. The Secretary-Treasurer may appoint one to three to serve as a committee for the specific grievance, so as to insure impersonal and impartial tribunal suited to the grievances involved. The Board of Directors reserves the right to appoint such committee, and is to be kept informed of subject matter and appointment of committee on various grievances.

The President and Secretary-Treasurer are Ex-Officio Members of all Committees.

California Pest Control Association, Inc.

After the successful Fifth Annual Convention and sponsorship with the cooperation of the National Pest Control Association of the Second Annual Pest Control Operators Conference, President Charles Mollard of the California State Association is settling down to the routine of an all round program to be conducted during the ensuing year. Chairmen of the various committees were announced:

O. W. Dickens, 1940 Annual Meeting at Los Angeles.

G. A. Rader, 1940 Pest Control Operators Conference Publicity and Monthly Bulletin.

W. Jay Burgin, Membership (Southern California).

V. H. Montgomery, Membership (Northern California).

Elmer A. Roberts, Legislation.

A. T. Parsons, Rules and By-Laws.

A. L. Forde, Advertising.

Wilbur F. Smith and Charles Menard, Insurance.

J. K. Hougham, Ethics.

E. G. Mills and Wayne K. Davis, Auditing.

There are other committees to be appointed but these assignments will be announced at a later date.

The important item of immediate business is that of amending the present Structural Pest Control Law. Elmer A. Roberts reports progress as representatives of all groups in the industry conferred as to the amendments desired.

Fourteen members of the California pest control industry, representing the various pest control operators organizations, met in Los Angeles on March 23, 1939, to discuss the three legislative bills relating to pest control. Those present were L. W. Christensen, R. B. Loibl, H. Grundy, C. W. Mollard, D. G. Rennie, Wilbur Smith, M. G. Jorgenson, E. A. Roberts, R. E. Hackley, J. R. Stinson, G. R. Lovejoy, G. M. Culton, O. W. Dickens, Wm. Hogan and Attorney Mr. Cunningham.

Much attention is also being given to the matter of a major heading in the classified telephone directories. The wishes of the group are for "Pest Control" but as in a few of the other cities there is still much work to be done to have this change brought about.

San Diego, California—District No. 1

With an almost 100% membership of the active pest control operators, the local association in San Diego, under the leadership of Lee W. Christensen, is planning an active educational program.

The membership includes: L. W. Christensen, C. M. Swope, H. B. Casserley, E. A. Thomas, Edward G. Greene, E. R. Smole, J. N. Johnston, Ranald MacDonald, J. Rex Murray, Adrian Earle Michael, Norman E. Raleigh, Charles J. Scherrer, H. A. Suttle.

Oakland, California—District No. 6

John A. Farley, on March 14th, presided as the new district president at the "Fried Chicken Feast" meeting held at Bertolas' restaurant.

Consideration was given to advertising practices. It was decided to submit all advertising material to a special committee and thus have approval given which, it is hoped, will largely eliminate what is commonly referred to as unethical and exaggerated advertising.

Classified telephone directory of "Pest Control" was also taken up.

San Francisco, California—District No. 7

The principal item of business at the regular monthly meeting was that of the heading in the classified telephone directory where the sentiment is very strong for the major heading to be "Pest Control." Charles Menard reported on his work on this matter and will confer with the telephone officials.

A Good Idea Is Worth Repeating

Private House Rat Jobs

We are now entering the season of the year when rats are on the move—away from warehouses and stores to the open country. Private homes, especially those older ones which are large old-fashioned outbuildings, are often troubled with rats in the spring. This would be a good time to get in touch with owners of homes built in the days when "carriage houses" were in vogue.—From Cyanogas News.

THALLIUM SULPHATE
DELIVERIES FROM SPOT STOCKS
JUNGMANN & CO.
INCORPORATED
Industrial and Fine Chemicals-Raw Materials
157 CHAMBERS STREET
TEL. BARCLAY 7-5128-30 NEW YORK CITY

WIZO RAT GLUE
Gets Results!
Eliminates the use of poison. Remains highly gummy.
25-lb. cans @ 50c per lb.
10-lb. cans @ 55c per lb.
5-lb. cans @ 60c per lb.
Wizo Rat Glue Boards
Set consists of Two Boards 8"x12"—Individually Wrapped
1 Dozen Sets $7.20
1/2 Dozen Sets 4.00
1/4 Dozen Sets 2.25
F. O. B. New York, N. Y.
Write for our catalog describing our complete list of exterminating and sanitary chemicals.
ELKAY PRODUCTS CORP.
323-327 West 16th Street New York, N. Y.

National Association Notices

Members are urged to call on each other, especially when traveling about the country. A permanent office is not required, but for those firms visiting New York City, it is urged that the secretary be called at either South 8-4120 or South 8-4121 and appointment will be arranged.

Communication No. 142: Usual membership service letter sent April 21st and featuring the subject of Insurance and Precautions.

Communication No. 143: Usual membership service letter which was also sent to those who attended the three Pest Control Operators' conferences earlier this year. This was mailed April 28th and contained also the complete membership roster of the Association that shows an active membership of over 425 firms, over 40 Allied members (manufacturers and supply houses) and six Honorary members.

Communication No. 144: Usual membership service letter which featured the announcement about the "Advertising Institute" and mailed on May 3rd.

Communication 6-D: Official letter to the Board of Directors outlining business routine of the Association with emphasis of the Seventh Annual Convention. Mailed on April 21st.

Communication 6-E: Official letter to the Board of Directors containing business routine of the Association business.

Labels: The Federal Insecticide Act apparently calls for the change in phraseology and other details. This subject will be covered in a subsequent membership service letter.

Seventh Annual Convention: Enthusiasm continues to run high for what should be the largest attended Convention thus far held. Remember the dates, October 23-24-25 and at this early date we want to emphasize that the Convention is open to all firms of the pest control industry. Registration fee is to be $7.50 for members and $10.00 for non-members. Unusual entertainment will be a part of the evening program but by far the most important purposes of an educational program will be taken up in three full days of addresses, discussions, clinics, booth exhibits, and other displays.

National Seal: It is gratifying to notice the general use of the seal on letterheads, advertising and classified telephone directory advertising. If you have not ordered your cut, do so immediately. Cuts are provided in two sizes, ½x¾" and ¾"x1". The charge is $1.00 per cut or if two or more are ordered at the same time, $1.00 for the first cut and 50c additional for the extra cuts. No orders filled without check or money order accompanying. All orders for seals must be made directly to the secretary of the association at 3019 Fort Hamilton Parkway, Brooklyn, New York.

Pest vs. Parasite Battle Will Be Feature at Fair

San Francisco.—Pest versus parasite in a battle royal under glass.

This will be the central theme of the University of California zoological display in the hall of science at the 1939 California world's fair, it was revealed Wednesday as specimens were encased for shipment to Treasure Island in San Francisco bay.

Most spectacular of these pest-parasite struggles, and one incidentally which has involved millions of dollars, will be the battle between Citrophilus Mealy and Australian Chalcid. The mealy bug once threatened to wipe out California's citrus orchards; the university sought and found the chalcid in Australia. Shipped here in droves, the chalcid, a parasite on the pest, relieved an acute situation in the citrus industry.

Throughout the 288 days of the exposition the chalcid war on the mealy bug will be waged under glass covering. Millions of fair-goers will see the struggle, learn first hand how science has developed a means of saving an entire industry.

In another part of the display the Australian Lady Bird Beetle will engage the Cottony Cushion Scale in mortal combat, and in still another the Oriental Chalcid will take on the Yellow Scale.

Branching away from warfare, the university will present a brighter picture in showing the life work of the honey bee. The part this helpful insect plays in pollenization as well as in the making of honey will be shown by the bees themselves.

The history of termites and the damage they do and the methods of combatting them will be given. Animal speciation—the classification of animals into species—will be shown, along with coloration and other features identifying types and kinds.

"Less advice and more hands."

DEATH

FOR INSECTS • EASY PROFITS

for you with

CHEC INSECTICIDES

Start making easy profits now with practically no extra work by selling, as well as using, Chec Insecticides. They come in attractive packages for retail sales and in larger packages for service use. They're simple to use . . . do the job in a jiffy . . . and they're killers. Start carrying them today and make every call more profitable.

CHEC ANT PASTE . . . kills grease and sweet-eating Ants . . . 1 and 8 oz. tubes for retail sales . . . 1 and 5 lb. cans for service use.

CHEC HOUSEHOLD FUMIGANT . . . kills Moths, Carpet Beetles. Simple to use. No spraying. Will not harm the most delicate fabrics. Leaves no odor. 8 oz. bottles for retail trade.

CHEC SILVERFISH PASTE . . . positive, quick, clean. 1 and 8 oz. tubes and 1 and 5 lb. cans.

CHEC SUPER CONCENTRATE . . . Ideal for moth-proofing rugs, furniture, etc. Easy to use. Comes in 1 qt., ½ gal., 1 gal., and 5 gal. containers. One quart makes 5 gallons when diluted.

Write today for information and prices on these high quality Chec Insecticides. Start making extra profits now.

THE CHEC COMPANY

Dept. P • Arcade Bldg. • Saint Louis, Mo.

STOP Termite Damage with CHIPMAN DRY SODIUM ARSENITE

• Chipman Dry Sodium Arsenite is an excellent treatment for infested, unpainted woodwork; for foundation timber footing, piles, joists, and all underground timber. Extremely effective in stopping termite entrance into buildings from the parent soil colony. Completely soluble in cold water. May also be used in its original dry form.

Write for Literature and Prices

CHIPMAN CHEMICAL CO., Inc.

BOUND BROOK, N. J. NO. KANSAS CITY, MO.

PALO ALTO, CALIF.

Also Manufacturers of Rotenone Extracts and Special Rotenone Products.

WHAT'S NEW IN PEST CONTROL-PERSONALS

The sincere sympathy of the industry is extended to Mrs. Emanuel Mendel and family who on April 13th were bereaved by death of faithful husband and father, Emanuel. Funeral services were conducted at the Riverside Chapel on April 16th. N. Fremed and William S. Shrimplin attended the services. Mr. Mendel has for many years operated the Ant Roach Company of New York City.

Our expressions of sympathy are also offered to Mr. Jason Radloff and his sister on the recent loss of their mother. Mr. Radloff is the manager of the Houston, Texas, office of the Abel Exterminating Co. of Dallas, Texas. Interment took place at Cincinnati, Ohio.

Henry Mahler, of the Mahler Exterminating Co., of New York City, started on his annual cruise south, claiming that his yacht is working as smoothly as ever.

McCormick & Company of Baltimore, Md., provided an interesting inspection tour of their plant during the recent meetings of the American Chemical Society. Martin Meyer of Philadelphia speaks enthusiastically about the trip.

Announcement has been made by the Huttig Sash and Door Co., of Texas, that their Termite Control Division will be supervised by W. B. Hill of Memphis, Tenn., who for over ten years has been engaged in termite control work and more recently with his brother, Joe Hill, conducting the Knox-Ant Corporation. W. B. Hill is also active in the affairs of the National Pest Control Association.

We have heard of New Yorkers missing trains but it surely sounds bad when men like Charlie Houghton, of Boston, barely made his train and Pete Bohman was still performing at 3 A. M. after missing the 11:30 P. M. It is rumored that Pete has signed up to sing at the "Game Cock" from henceforth and now on.

It sounds as if the Ransford Insecticide Company, of Worcester, Mass., was branching out in that George Elliott was found roaming around Nashua, New Hampshire. Congratulations, George, on the recent booklet, the adaptation of the Western Exterminating booklet of Los Angeles, Calif. The title is "Public Enemy."

Calvert Cissel, Martin Meyer, and Gilbert Stover will represent the National Pest Control Association at the 27th annual meeting of the United States Chamber of Commerce being held in Washington, D. C., May 1-4.

Lethelin Products Company, of Wood Ridge, N. J., has moved its Mt. Vernon, N. Y., plant from N. Bleeker St., to 341 North High St., Mt. Vernon, N. Y. The larger space will allow for better facilities to handle Magikill, Borekill, Paratox and Japex. The latter is said to be particularly good for Japanese beetles. Congratulations and much success.

The Pacific Slope Branch of the American Association of Economic Entomologists has shown a splendid spirit of cooperation in extending to practical pest control operators' an invitation to attend its 24th annual meeting which is to be held at Stanford University June 27-28-29, 1939. From Dr. Smith, the chairman, we will receive information regarding the program which has not as yet been completed.

The employees of the Alderman Company of Pasadena, Calif., recently enjoyed a week end at the famous Balboa Isle "Earthquake"

cottage. "Dad" Alderman, famous sponsor of the "P. C. O. Standbys," is on the extreme left while his son, Arnold, is on the extreme right. Wilbur F. Smith is second from the left. Mr. Smith is active also as a member of the Structural Pest Control

FACTS

About Per-Mo Permanent Mothproof Liquid

Per-Mo is easily applied to rugs, carpets, over-stuffed furniture, drapes, blankets, wearing apparel and other woolen articles. Chemists' tests prove that Per-Mo becomes an integral part of the fabric, the same as a dye. Its efficacy is not impaired by dry-cleaning, washing, exposure or use. Even years after the application of Per-Mo moths cannot injure any fabric so treated.

WHAT SOME USERS OF PER-MO SAY

We are proud to say that we have used quite a bit of the Per-Mo mothproof material, and so far, have found it to be very satisfactory.—Pest-Control Operator.

Since using Per-Mo in this building five years ago we have never seen any sign of moths. We cannot recommend your product too highly.—Apartment Manager.

Since having my entire house treated with Per-Mo I've had no fear of moths whatsoever, and it has been a joy and help. I can most sincerely recommend Per-Mo.—Housewife.

Per-Mo Mothproof is a colorless and odorless liquid, that is applied to any woolen fabric with a spray-gun, either electrically or hand powered. Write for full particulars.

Salesmen and Jobbers Write for Exclusive Territory.

PER-MO MOTHPROOF CO.

3729 Virginia., Dept. M. Kansas City, Mo.

For Rat Extermination

CALICO BAIT

Kills All Rats in 4 or 5 Days

A mixed Cereal Bait combined with PROVEN LURES

A Safe Powdered Squill Product

READY TO USE - DOUBLE STRENGTH

10 lbs. Bulk	$2.50	50 lbs. Bulk	$10.00
25 lbs. Bulk	5.50	100 lbs. Bulk	19.00

Or in 8 oz. Cans, 2c per lb. higher
DELIVERED

For Sure Extermination of Mice

CALICO SEED

Double Strength

Kills All Mice in 4 or 5 Days

That's Our GUARANTEE!

10 lbs. Bulk	$4.00	50 lbs. Bulk	$12.00
25 lbs. Bulk	7.00	100 lbs. Bulk	22.00

Or in 8 oz. Pour Spout Cans, 2c per lb. higher
DELIVERED

Choice of Anise, Chocolate, Butter, Cheese or Rodium lures. Anise furnished unless otherwise specified.

ORDER NOW!

The Bagnall Company

STATION A KANSAS CITY, MO.

Board of California and regional vice president of the National Pest Control Association.

Believe it or not Ripley, but Dad Alderman is covering four of a kind and keeping his poker face for the killing of a "big pot."

After a lapse of five years, Mr. F. E. Bohman has been recalled by the Birchard System, Inc., 173 Church Street, Hartford, Conn., to act as vice president, treasurer and general manager. Felicitations and lots of luck to you.

The Alameda County Flower Show at the Oakland auditorium will have an interesting exhibit on pest control. Plans are under way for a cooperative exhibit sponsored by the California Pest Control Association members of District No. 6.

Will someone work on a bait for bedbugs? We spray—we fumigate—we repel—we kill—we claim residual content for the sprays—etc., etc., etc. "Maybe," says one, "there should be considered a synthetic blood placed around in sponges." One for research men.

Mr. and Mrs. Conrad Bohman, of Rochester, New York, enjoyed their wedding anniversary by taking a trip to Bermuda. Mr. Bohman is president of Bohman Brothers.

ARSENIC FOR PESTS

According to figures gathered by the United States Bureau of Entomology and Plant Quarantine, United States farmers use 100,000,000 pounds of arsenic preparations yearly in their battle against the codling moth, the cotton boll weevil, the Mexican bean beetle, the Colorado potato beetle, and the grasshopper.

Rumor has it that "Red" Clem, Manager of the Rose Exterminator Company office at St. Louis, Mo., is about to become married. Is the date June 24th?

Mr. and Mrs. Eugene Sameth are reported as enjoying a splendid vacation in the southland. Mr. Sameth is one of the officers of the Sameth Exterminating Co. of New York City. While in Florida Mr. Sameth enjoyed being with his father, Nathan Sameth, the founder of the Sameth Exterminating Company.

H. C. (High Combustion) Kaufman of Chicago, Ill., claims that the trip to Mexico after his recent operation served as the finest recuperation that could possibly be had. "H. C." is one of the three brothers who operate The Pesticide Company of Chicago.

Col. Leopold Philipp of Disinfecting and Exterminating Corp. of New York has been giving considerable of his time to the New York World's Fair Commission. Col. Philipp as chairman of the Seventh Annual Convention Entertainment Committee is trying to arrange something special during the special day assigned the "Pest Control Industry" on October 27th.

Fish Poison Import Rises

Rotenone-Bearing Roots Are Being Used Against Insects

Washington. — Rotenone - bearing roots, used for centuries in the tropics as a fish poison, are becoming increasingly important in this country for the manufacture of insect poisons, according to the Commerce Department today. Imports of these roots rose by 25 per cent in the past year, reaching 3,000,000 pound valued at $382,000.

Most of these roots come from Latin America, where the natives beat them into a pulp, throw them into streams and thus stupefy fish, which rise to the surface and are easily caught.

J-O PASTE

To the vermin exterminator who is desirous of extending an outstanding service to his client J-O PHOSPHOROUS PASTE *is* the solution

For the control of rats and roaches this product is widely and successfully used by Pest Control Operators throughout the country.

J-O ROACH TRAP

For use with J-O Paste

Convenient & Safe

TRIAL OFFER

Send $1.00 and we will ship to you postpaid a two-pound can of J-O Paste, with twenty-four J-O Roach traps, as illustrated.

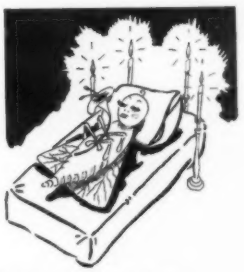
Prices on 25 and 45 Lb. Pails on request

JOHN OPITZ, INC.

50-14 39th Street Long Island City, N. Y.

Manufacturers of Exterminating Products Since 1874

MARTHA MOTH who *Never Married!*



Nice girl Martha. Plenty of S.A. IT in large gobs—but IT didn't help her any. • Martha thought she was safe from the fumigator deep, deep down there in the upholstery of Grandma's best chair, but LARVACIDE reached her even there. • Tough for Moths, but blankets, deep upholstery and other snug retreats can't save them from LARVACIDE'S penetrating fumes. • Exterminators like LARVACIDE because it penetrates wherever the insects can penetrate—kills them, larvae, egg life and all. • And LARVACIDE cuts fumigation risks. Its inseparable warning quality drives out—and *keeps out* all who have no business in premises under fumigation. • Write for interesting, informative literature on SAFER and EFFECTIVE FUMIGATION. Write

Larvacide

CHLORPICRIN

The SAFER Fumigant

INNIS, SPEIDEN & CO.

Established 1816

117 Liberty Street, New York

BOSTON • PHILADELPHIA • CHICAGO • CLEVELAND • KANSAS CITY

WRITE FOR THESE BOOKLETS

The latest helpful informative service literature will be sent to you without cost or obligation. If in addition there are any particular pieces of literature offered by advertisers in this issue you are interested in receiving, either write them direct, or if you prefer, please send us such requests.

Please note, however, that you must request each booklet on a separate letterhead, though they may all be mailed in the one envelope to 514 East 14th St., Kansas City, Mo.

INSECT DISPLAY PREPARATION FOR PEST CONTROL OPERATORS

Descriptive literature of pocket display cases, for salesmen's use or for show case or counter exhibits. Common household pests; carpet bettle assortment; clothing moth life cycle. Special black widow life history; ant collection. Injurious insects, etc. Write WARD'S c/o Pests.

STOP THIS ROBBER WHO TAKES UP TO 3% OF YOUR GRAIN

Is the title of a worthwhile leaflet, illustrated, discussing granary insects. Weevil and other insects, weevil odor, insect heat, hollow berries and lowering of grade and their control.

FREE COPY MAY BE HAD BY ADDRESSING SPEIDEN c/o Pests.

The Chec Company, formed recently in St. Louis to manufacture insecticides and allied chemicals, is making the following products: Chec Household Fumigant for the control of moths; Chec Ant Paste for killing both sweet and grease-eating ants; Chec Silverfish Paste; Chec Fotophenol for the control of sleeping sickness in horses; Chec Super Concentrate for moth-proofing; and Chec Powder Post Beetle Solution for the control of wood borers.

LITERATURE ON ALL ABOVE PRODUCTS MAY BE HAD BY ADDRESSING CHEC c/o Pests.

New Centrobulb, Jr., pictured has all the features of the large professional Centrobulb in use by many of the exterminators. Since many householders do their own exterminating work and are not usually good prospects for this type of service by the professional exterminator, the manufacturer of Centrobulb, Jr., claims this type of prospect may be an additional source of profit if you will sell him the smaller bulb for his own use.

WRITE FOR FURTHER INFORMATION TO CENTRAL c/o Pests.

THE CITY OF NEW YORK

Economic, Historical and Descriptive Facts selected by the Chamber of Commerce of the State of New York. 111 page pamphlet covering all the worth while facts concerning New York which you will find most handy when you make your trip to New York to take in The N. P. C. A. Convention and the Fair.

FREE COPY MAY BE HAD BY ADDRESSING INNIS, c/o Pests.

A new handsome 36-page catalog of technical books has just been issued by the Chemical Publishing Co., Inc., New York City. It covers domestic and imported books on chemistry, physics, mathematics, medicine, metallurgy, machinery, engineering, biology, general science, business, manufacturing, formularies and technical dictionaries.

A copy will be sent to anyone interested on receipt of stamps to cover postage.

DRY SODIUM ARSENITE

Circular descriptive of its use for Grasshopper Bait, Weed Killer, Mormon Cricket Dust, Tree Killer, Termite Control, Wood Preservative. Method of treating foundation timbers and treatment of infested timbers. FREE COPY MAY BE HAD BY ADDRESSING CHIPMAN, c/o PESTS.

An interesting circular has come to our desk from Pyrethrum-Rotenone-Red Squill Products Division of S. B. Penick & Co., 132 Nassau Street, New York, showing large scale production of PYREFUME at the new Penick plant in Lyndhurst, New Jersey. Pest control operators attending the World's Fair are cordially invited to make the rounds of the Penick plants. Just

SPECIAL

THALLIUM SULPHATE BAITS!

for RATS and MICE: TAT Mixed Seeds. Wheat, barley, hulled oats. Seeds colored. Active ingredient ***Thallium Sulphate*** 1%.

100 lbs.....$17.00 25 lbs.....$5.00
50 lbs..... 9.00 10 lbs. (min. quantity).... 2.50

TAT Canary Seed. Uncolored. Active ingredient ***Thallium Sulphate*** 1%.

100 lbs.....$21.00 25 lbs.....$6.00
50 lbs..... 11.00 10 lbs. (min. quantity).... 3.00

for ANTS: TAT Ant Syrup—or jelly if preferred. Syrup VERY heavy —weight approximately 10 lbs. per gallon.

SPECIAL PRICE PER GALLON.....$4.25

Active ingredient ***Thallium Sulphate*** 1.30%.
(1.30% proper amount for most effective control)

BED BUG CONCENTRATE. NEW! ALMOLENE D. Dilution rate 1:128. One ounce Almolene D added to ONE GALLON base oil makes completed spray. **May be perfumed.** Simple to mix—effective—economical.

Pint (16 oz.).....$2.00 Gallon (128 oz.).....$12.00
Cuts Cost of Active Ingredient to Less Than 10c per Gallon.

TAT TERMITE C: Paint replaced timbers with this product. Protects timber against termite attack or rot (dry or wet). Colorless. Such treated timber may be painted, glued, etc. Offers additional protection when treating for termites.

TAT TERMITE C, 1 Gal.....$1.60 5 Gal.....$8.00

Other popular TAT Products include TAT Ant Traps, TAT Roach Traps, TAT Ant Bait, TAT Rodent Bait, Ace Ant Traps, Treated Whole or Shelled Peanuts, etc.

Prices F.O.B. Upper Montclair, N. J.
TERMS: Cash with order. Usual trade terms after credit is established.

Manufactured By

SOILICIDE LABORATORIES Upper Montclair, N. J.
Largest Manufacturers and Distributors of Finished Thallium Sulphate Baits

"POSITIVE" - "SAFE" and "SURE"
USICO SILVERFISH CONCENTRATE

"FACTS"

KNOWN WORLD WIDE!

(1) It will exterminate all Silverfish in building completely and properly treated within 40 days; ONE TREATMENT will protect against reinfestation for THREE YEARS.

(2) Harmless to human beings and animals, simple to apply, no tearing up or marring woodwork, yet placed away from any chance of removal. No inconvenience to tenants whatever.

(3) One pound will treat completely — three 2-room apartments, two 3-room apartments, or a basement room 20x20.

(4) It has fulfilled every claim made for it, under the worst conditions known. Write for testimonials.

(5) "NEW LOW PRICES"— $1.00 per pound, f.o.b. Seattle, Washington. Minimum amount 10 pounds. Shipped express.

(6) *Don't envy the exterminator who can guarantee the above performance, be one!!!*

U. S. INSECTICIDES CO.

412 Hoge Building Seattle, Washington

call their New York office when you get there and they will do the rest. Circular sent on request.

"THEIR LAST MEAL"

Is the title of this interesting leaflet discussing Rats—their menace to health, modern control, etc. Moles, location of runs, control, method of use, etc. Mice, habits, etc. Roaches, damage, control. "Dogskoot" a dog repellent. Ants, control, remedy, etc.

YOUR FREE COPY MAY BE HAD BY WRITING NOTT, ALSO FREE SAMPLE OF TUBE OF ANT X ON REQUEST.

SANITARY CHEMICALS

50-page catalog of interest to recognized dealers and jobbers who are interested in the subject of private label merchandising, for such products as deodorant blocks, insecticides, such as fly sprays, bed bug and roach sprays, cattle sprays, mill and warehouse sprays, vaporizer sprays, moth sprays, roach powders, ant insecticides, rat poisons, agricultural sprays, mosquito larvicide. liquid deodorants such as chlorozif, formaldehyde sprays, pine deodorants, drip machine fluids, kilan-odor, theatre sprays, etc.

FREE COPY TO INTERESTED DEALERS AND JOBBERS. WRITE FULD, c/o PESTS.

EXTERMINATOR FOR MICE

Circular describing mice exterminator in seed form for use by professional exterminators, storage and warehousemen, institutions, hotels, restaurants, food and drug establishments, private homes and apartments. Also further information on Jelly for sweet and grease eating ants; concentrate for crawling and flying insects; compounded powder for roaches, ants, other vermin; concentrate for bed bugs and eggs; motor vaporator, etc.

FREE COPY MAY BE HAD BY ADDRESSING LUCAS, c/o Pests.

MOTH PROOF

Folder of unsolicited letters showing effectiveness of this moth proofing preparation. Folder discusses new odorless, stainless, non-explosive exterminator for moths, tow bugs, tobacco worms, carpet beetles, linen worms, and other similar pests.

FREE COPY MAY BE HAD BY ADDRESSING TERMAX c/o PESTS.

INSURED MOTHPROOFING COMPOUND

Circular matter describing an insured mothproofing compound on the market for 11 years. Complete insurance details and technical qualities of the compound in question and other information.

WRITE FOR YOUR FREE COPY BY ADDRESSING MORTOLIN c/o Pests.

AROMATIC PRODUCTS

32-page catalogue, 8½x11, having special sections devoted to Perfume Bases for Insecticide Sprays; for perfuming and coloring Paradichlorbenzene Crystals and Blocks in one operation; for perfuming and coloring naphthalene flakes and blocks in one operation; water soluble perfume oils for theatre sprays, etc. Of special interest to every pest control operator and insecticide manufacturer. Write for sample for fly sprays; for napthalene and paradichlorbenzene; for water base product; for formaldehyde products, etc.

FREE IF YOU WILL WRITE FELTON, c/o PESTS.

INSECTICIDE SOLVENT:

This is a descriptive folder covering high lights on volatility, refining process, specifications, killing power on Insecti-Sol, an insecticide spray and stock spray solvent and other qualities of interest to manufacturers of fly sprays. Insecti-Sol claims unusual advantages for use by pest control operators in the manufacture of their bed bug preparations.

DESCRIPTIVE LITERATURE WILL BE MAILED FREE TO READERS ON REQUEST. WRITE TO "PENNSYLVANIA," c/o Pests

Thos. W. Houchin Corp. desires to call the attention of pest control operators to the possibilities of creating additional business through the sale of powder put up in powder guns for the housewife. Most housewives would prefer such a blower even though priced a few cents more when they understand it is complete and will do the work very efficiently.

Dealers who have tried this idea claim excellent results. Write for more information with complete catalog to Houchin, c/o Pests.

AGRICULTURAL PRODUCTS

Attractively illustrated folder discussing chemistry in agriculture; jelly ant bait and directions for use on golf greens; gardens

Monarch Powder Sprays

Used by Many Leading Exterminating Concerns Throughout the Country

Large Opening in Neck Affords Easy Filling

Screens Powder Perfectly

Made of High Grade Materials

Made in 3 Sizes

No. 40 Has 14 Ounce Capacity

No. 41 Has 9 Ounce Capacity

No. 42 Has 8 Ounce Capacity

Write for Catalog and Price List

THE VANT WOUD RUBBER COMPANY
JERSEY CITY - - - - NEW JERSEY

RAT ENEMY No. 1

. . . PENICK RED SQUILLS

POWDERED (oven dried) and LIQUID - RODINE

Kills rats effectively. Physiologically standardized and tested for uniform toxicity.

PENICK PYRETHRUM—high pest-destroying potency; granulated and powdered (extremely fine).

PENICK'S Powdered TIMBO and DERRIS ROOTS—for improved roach and insect powders.

ROTENONE SOLUTION—ready for immediate use, steps-up Pyrethrum spray toxicity.

Send for Descriptive Booklets

S. B. PENICK & COMPANY
132 NASSAU STREET NEW YORK, N. Y.

and shrubs; household. Mention is also made of an organic turf fungicide and directions for its use. Borerkil for tree boring insects; effective method of borer control and directions for use. Borerkil force gun illustrated. Use as a dog repellent; fumigant for poultry roosts. Formula for nicotine spray also given.

FREE TO INTERESTED PEST CONTROL OPERATORS AND TREE SURGEONS. WRITE LETHELIN, c/o Pests.

AROMATIC PRODUCTS

Descriptive 38-page 8¼x11 Catalog, part of its contents devoted specifically to odors for Insecticides and Disinfectants. Pest Control Operators who make their own fly sprays, users of Lethane, kerosene, perfuming oils to scent and color napthalene and paradichlorbenzene blocks and crystals should send for a copy of this catalog, No. 10.

DESCRIPTIVE LITERATURE WILL BE MAILED FREE TO READERS ON REQUEST. WRITE TO GIVAUDAN, c/o Pests.

ROTENONE INSECTICIDES

Derris—Timbo—Cube

Informative illustrated brochure discussing Rotenone Roots as Insecticides; Reminiscent—and Romantic. The development of Derris Root as an Insecticide. Cube and Timbo from South America. Rotenone the principal constituent. Is Derris poisonous to man or animals? Do Derris, Cube and Timbo deteriorate exposed to light and air? Insect control chart. Powdered Derris Root used as a spray material. Rotenone added to Pyrethrum Sprays. Derris in Livestock Sprays. Derris in Flea and Lice Powders. The labeling of Insecticides. Deridust. Derris Extracts, etc.

FREE COPY MAY BE HAD BY ADDRESSING PENICK, c/o Pests.

TERMITES AND FIRE

Attractive booklet discussing what not to use and what to use; kinds of treatment; Government Records; What Should Be Used; Penetration; Kerosene Mixture; When and how to make Timbers termite proof; what does it cost; testimonials; guarantee; quality affidavit; important caution; painting after treatment, etc.

FREE COPY MAY BE HAD BY ADDRESSING WOOD c/o Pests.

FUMIGATION MANUAL

Forty-six-page thoroughly informative manual covering the following subjects: Preparation of Building for Fumigation; Dosage and Exposure; Fumigation Operation; Atmospheric Fumigation Chambers; Ship Fumigation; Common Household Insects; Stored Commodity Insects; General Information; General Rules and Precautions covering first aid and equipment used. Illustrated.

MANUAL MAILED FREE TO INTERESTED PEST CONTROL OPERATORS; WRITE ZYKLON, c/o PESTS.

MODEL OF THE CLOTHES MOTH LARVAE

Since the general public has no conception of the appearance of this tiny worm that causes destruction to clothes, furniture, rugs, furs, etc., wherever this model has been used in demonstrations the effect on the public has been startling. Properly displayed in your store or window, it will bring results in the way of increased business. Model is 15" long, made of durable plastrine composition, all parts accurately reproduced and colored. It is provided with a practically invisible base giving the larvae a most natural appearance when displayed on woolens, furs, etc., to simulate its feeding habits.

Complete data on this display as well as life-history displays of insect pests, such as Termites, Clothes Moths, Roaches, Bedbugs, Carpet Beetles, Dermestids, etc., may be had BY ADDRESSING SCIENTIFIC, c/o PESTS.

"Shallow waters make most din."

Additional Patents Relating to Pest Control

By DR. R. C. ROARK

EDITOR'S NOTE: *This service is provided through the Department of Agriculture for the purpose of bringing to the attention of those interested such matters that may be of assistance to the industry. The Department of Agriculture assumes no responsibility for the merits or workableness of any of the inventions mentioned. Copies of all patents can be obtained for 10c (no postage stamps) sent to the Patent Office, Washington, D. C. When placing orders be sure to note the number of the patent, the date, the name of the patentee and the subject of the invention.*

2,143,043 (Jan. 10, 1939; appl. Jan. 25, 1935). TREE BAND. Monroe L. Wexler, Philadelphia, Pa.—Sears, Roebuck and Co.—This tree band, for use in destroying small vermin which infest fruit and shade trees, is coated with a poisonous solution, such as beta naphthol.

2,143,246 (Jan. 10, 1939; appl. July 21, 1937). VAPORIZER. Walter J. McGary, Montgomery County, Ohio.—This invention relates to a vaporizer, medicator and deodorizer in which certain liquids or crystals may be vaporized by the application of heat.

2,143,260 (Jan. 10, 1939; appl. Dec. 4, 1936). PORTABLE SPRAYING APPARATUS. Fred A. Cuff, Chicago, Ill.—H. D. Hudson Mfg. Co., Chicago, Ill.

2,143,816 (Jan. 10, 1939; appl. Feb. 23, 1937). DITHIOHYDANTOINS. Ralph A. Jacobson, Wilmington, Del.—E. I. duPont de Nemours & Co., Wilmington, Del.—The patentee claims a 2,4-dithiohydantoin, also a 2,4-dithiohydantoin in which at least one hydrogen atom attached to ring atom 5 is replaced by a hydrocarbon radical, or an alkyl radical. The products of the present invention are useful as insecticides.

2,143,817 (Jan. 10, 1939; appl. Sept. 6, 1935). SPRAYING AND ATOMIZING DEVICE. Harry W. Longdin and Julian C. Stanley, Atlanta, Ga.—S. A. Love, Decatur, Ga.

2,143,821 (Jan. 10, 1939; appl. July 9, 1934). RECOVERY OF HYDROCYANIC ACID. Frederick W. Speer, Jr., Vineland, N. J.—Rohm and Haas Co., Philadelphia, Pa.

2,144,366 (Jan. 17, 1939; appl. Oct. 24, 1933). OXIDATION INHIBITOR FOR INSECTICIDES. Dalton B. Faloon, Beacon, N. Y.— Hammond Paint & Chemical Co., Inc., Beacon, N. Y.—An insecticide comprises an easily oxidizable organic vegetable toxic material of the group consisting of pyrethrum and rotenone and a phenol of the group consisting of lignicol, guaiacol, cresol, thymol, phenol, eugenol, resorcinol, parogallol and hydroquinone to stabilize the same.

2,144,367 (Jan. 17, 1939; orig. appl. Oct. 24, 1933. Divided and this appl. May 14, 1938). OXIDATION INHIBITOR FOR IN-

DIRECT
From the MANUFACTURER TO YOU!!
G & S RAT GLUE
NON-POISONOUS, ODORLESS, LIVELY GLUE
5-lb. Tins @ $0.40 per lb.
25-lb. Tins @ .38 per lb.
45-lb. Tins @ .35 per lb.
G & S PREPARED GLUE BOXES
Each Box Ready for Instant Use.
NO FUSS, NO HANDLING, SIMPLY REMOVE COVER
1 Dozen Lots.....$3.00 per doz.
3 Dozen Lots..... 2.75 per doz.
Also "2 in 1" Glue Boards.
F.O.B., Brooklyn, New York
Manufactured and Distributed By
G & S Exterminating Supply Co.
140 Nostrand Avenue - Brooklyn, New York
Write for Descriptive Literature.

Termax Sun-Ray Moth Proof
Makes For Satisfied Customers
Effectively eliminates moths, tow bugs, tobacco worms, carpet beetles, linen worms, and other similar pests.
COLORLESS, ODORLESS, STAINLESS, NON-EXPLOSIVE
EXTERMINATOR - ECONOMICAL - INEXPENSIVE
Send for batch of convincing unsolicited testimonials and details of special proposition for pest control operators.
MANUFACTURED BY
TERMAX CO., INC.
2288 University Avenue, St. Paul, Minn.

SECTICIDES. Dalton B. Faloon, Beacon, N. Y.—Hammond Paint & Chemical Co., Inc., Beacon, N. Y.—An insecticide comprises a volatile solvent vehicle, an easily oxidizable organic vegetable toxic material of the group consisting of pyrethrum and rotenone dissolved therein, and a naphthol of the group consisting of alpha naphthol and beta naphthol to stabilize the same.

2,144,368 (Jan. 17, 1939; appl. May 14, 1938). OXIDATION INHIBITOR FOR INSECTICIDES. Dalton B. Faloon, Beacon, N. Y.—Hammond Paint and Chemical Co., Inc., Beacon, N. Y.—An insecticide comprises an easily oxidizable organic vegetable toxic material of the group consisting of pyrethrum and rotenone and a naphthylamine to stabilize the same.

2,144,369 (Jan. 17, 1939; appl. May 14, 1938). OXIDATION INHIBITOR FOR INSECTICIDES. Dalton B. Faloon, Beacon, N. Y.—Hammond Paint and Chemical Co., Inc., Beacon, N. Y.—An insecticide comprises an easily oxidizable organic vegetable toxic material of the group consisting of pyrethrum and rotenone and an aromatic amine of the group consisting of diphenylamine and benzidine.

2,144,552 (Jan. 17, 1939; appl. June 24, 1937). ALKANOL-AMINE SALT OF MANDELIC ACID. Horace A. Shonle, Indianapolis, Ind.—Eli Lilly and Co., Indianapolis, Ind.—The patentee claims an alkanol-amine salt of mandelic acid, in which the alkanol group is a lower alkanol group. These are especially suitable for urinary antisepsis.

2,144,632 (Jan. 24, 1939; appl. Dec. 2, 1935). DEODORANT POWDER. Henry E. Melton, Detroit, Mich.—C. E. Jamieson & Co., Detroit, Mich.—A deodorant powder comprises zinc peroxide from 15 to 20% kaolin from 1 to 5%, and the balance a neutral body.

2,144,808 (Jan. 24, 1939; appl. Aug. 27, 1934). INSECTICIDE COMPOSITION. William B. Parker, Placerville, Calif.—California Spray-Chemical Corp., Berkeley, Calif.—An insecticidal oil emulsion composition comprises a refined mineral oil as the continuous phase, an emulsifier adapted to the formation of a water-in-oil type of emulsion and an aqueous discontinuous phase dispersed in the oil, the volume ratio of oil to aqueous phase being at least about one to four and the dispersion being sufficiently stable to persist as such until deposited on a parasite infested host. The polyvalent metal soaps of the ordinary fatty acids such as oleic, stearic, palmitic, etc., are effective in producing stable water-in-oil emulsions when water is introduced into an oil solution of about 1 to 5% of the emulsifier.

2,144,956 (Jan. 24, 1939; appl. March 28, 1938). MOUSE TRAP. Herman F. Arndt, Green Lake, Wis.

2,145,015 (Jan. 24, 1939; appl. June 4, 1936). DRY DISINFECTING COMPOSITION AND METHOD OF MAKING THE SAME. Max Y. Seaton, Greenwich, Conn.—Westvaco Chlorine Products Corp., New York, N. Y.—A new composition of matter in the form of a dry powder stable on storage and having detergent and disinfecting properties comprises essentially crystallized sodium carbonate, crystallized di sodium phosphate and sodium hypochlorite.

2,145,214 (Jan. 24, 1939; appl. March 3, 1936). PARASITICIDE. David Walker Jayne, Jr., Elizabeth, N. J.—American Cyanamid Co., New York, N. Y.—A mothproofing composition contains a paratertiary alkyl phenolic salt of dixylyl guanidine in a volatile solvent.

Poisoned Butter Stolen; Police Broadcast Alarm

Montreal, Que. — Authorities sought to recover a stolen pound package of butter, which they said was impregnated with enough poison "to kill 100 people." The butter was taken from an exterminating company's premises.

Fearing it might get into the hands of an innocent purchaser, police broadcast a warning of the fatal possibilities, and requested the thief to return the package on a "no question asked" basis.

The poisoned food was indistinguishable in odor and taste from ordinary butter, the exterminating company's manager said.

Girl Breaks Tradition and Mouse Bites Her

Would-Be Classroom Heroine Scorned Flight From Rodent

A sixteen-year-old girl who was not afraid of a mouse that invaded a classroom at the Vocational High School, 212 West Thirteenth Street, became a casualty when the mouse bit her on the hand.

While her classmates scrambled up on desks and chairs amid screams and shrieks, Violet Powell, who lives at 94 Prospect Park West, Brooklyn, chased the mouse into a corner and picked it up. She dropped it when it bit her on the left hand. After treatment by a doctor from St. Vincent's Hospital, Violet was permitted to go home.

The mouse escaped.

Manufacturers Estab. 1851

Houchin's Products

Used By Leading Pest Control Operators

Our blowers are designed to blow your insecticide back into the nooks and crevices where vermin breed and hide. Constructed for long, constant service.

WRITE FOR FULL DETAILS

Thos. W. Houchin Corp.
9-15 McPherson Place
Jersey City, N. J.

CUTS—It Pays to Illustrate

Write for Prices and Information

PESTS, Cut Dept.
512 East 14th St. Kansas City, Mo.

A NON-POISONOUS RAT KILLER

15c PER POUND IN ONE-POUND TIN CANS

For Safety, Effectiveness and Economy —USE

SUR-RID RAT KILL

Try It—It Saves Time and Money

SUR-RID Rat Killer is tested in our own laboratory on both wild and tame rats and we GUARANTEE the Killing Power.

SUR-RID Rat Killer contains meat, cereals, vegetables and just the right amount of a tested killing agent. It is especially appetizing to rats and mice as there is only an odor of fresh meat and vegetables and there is no raw odor of chemicals; four distinct lures, MEAT, FISH and CEREAL and CANTALOUPE, packed either assorted or of one kind to a case, which contain three dozen one-pound cans.

Due to the increase in the sale of this Rat Killer, we are reducing the price as follows:

	Per Dozen
Three Dozen Lots, labeled	$2.00
Gross Lots, labeled	1.90
Gross Lots, no label	1.80
The half-pound size, packed five dozen to a case	1.25

Freight Prepaid on Gross Lots, Less Than Gross Lots F. O B. St. Louis, Mo.

SUR-RID PRODUCTS COMPANY
Manufacturers
(FORMERLY REAL EXTERMININATING PRODUCTS CO.)
455 PAUL BROWN BLDG., ST. LOUIS, MO.

Monsanto Develops Wood Preservatives

"Santophen 20," technically described as pentachlorophenol, for preservation of wood was announced today by Ira Hatfield, plant pathologist in the research laboratories of Monsanto Chemical Company, following years of research to find something that will enable the lumber industry to meet new competition developing from other types of construction materials.

Hatfield declared it has been found in tests thus far completed that "Santophen 20," its derivative "Santobrite" (sodium pentachlorophenate), and its formulation "Permatol A" (pentachlorophenol in an organic stolvent) all will protect wood against degrading agents, such as decay and termites. Free from objectionable color and odor, the new preservative can be applied to wood without materially altering the wood's characteristic "feel" or appearance and without affecting subsequent finishing of the wood with paint or other surfacing.

"Modern homebuilders who follow the trend toward year-'round air conditioning and finished and heated basements are inviting trouble unless they take proper precautions to see that the wood used is guarded against decay and termites. The greater year-'round humidity in air conditioned homes creates an atmosphere more favorable to wood decay and in termite-infested regions a finished and heated basement will increase the active season of termites and wood degrading organisms once they enter the structure. Hence, wood protection is essential in modern buildings."

From the technical side of wood preservation, Hatfield recommended that pentachlorophenol in suitable solvents be thoroughly injected into wood by pressure for best and most lasting results. He pointed out that the material has beneficial results even when applied by less thorough methods.

New York World's Fair

Correction

In our April issue, in commenting upon the exterminating services at the New York World's Fair, and that part telling of services being cancelled with Exterminating Service Corp., we said that "it is said that the World's Fair authorities discontinued services with Exterminating Services Corp. because of objectionable publicity, as well as indiscreet sales efforts." In the interests of accuracy, it now appears that no complaint was registered by World's Fair authorities as to "indiscreet sales efforts," which might be construed as bordering on unethical practices.

The cancellation is reported to be due to what the World's Fair authorities considered as "unfavorable publicity," arising out of a news story appearing in the daily press. The work itself was reported as being satisfactory, and even under the new arrangement of services, some of the same employees are on this job.

The Knack of Selling Yourself

The "Knack of Selling Yourself" is just off the press. It is a good book for every P. C. O. to have in his library, for it deals with ideas and methods of selling oneself to the public. Every P. C. O. has this problem and on the successful solution of this problem depends the success of his business. This book definitely aids in the solving of this difficulty, contains 234 pages and is full of new ideas. Order from PESTS. The cost is $2.50.

BOOKS

Termites and Termite Control

An indexed reference book produced by the University of California Termites, Investigation Committee of engineers, scientists, and business men in six years' collaboration.

Contains the latest researches in facts on termites, the latest practical methods for exterminators, builders and architects. Contains 795 pages, including index; profusely illustrated.

Price (the new edition), Cloth Bound.....$5.00

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Practical Tree Surgery

By MILLARD F. BLAIR

An authoritative manual indispensable for Spray Operators and Tree Surgeons. It gives valuable information pertaining to the association between trees, fungi, and insects; and discusses the means employable in obviating some of the most serious injuries to them. Contains 89 excellent illustrations and line drawings.

Cloth Binding $4.00
Special Binding 5.00

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Imms Recent Advances in Entomology

As the title implies, is a book much enlarged, with many new illustrations, new facts of the past few years, with information of the advances along many paths of inquiry. It contains 94 illustrations and over 400 pages.

Contents in Brief: Some Aspects of Morphology; Metamorphosis; Paleontology; Sense Organs and Reflex Behavior; Fundamental Aspects of Coloration; Some Aspects of Ecology; Practical Application of Ecology; Parasitism; Biological Control. **Price, $5.00.**

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Our Enemy . . . The Termite

By THOMAS E. SNYDER

Senior Entomologist, Bureau of Entomology and Plant Quarantine, U. S. Dept of Agriculture

A book full of valuable information every member that deals with termite control should have.

Price $3.00

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

"A Manual for the Study of Insects"

This book of 401 pages and 633 illustrations is now in the twenty-first edition. Much space is given to accounts of the life histories and habits of insects. By means of the illustrations and analytical tables it is possible to determine the identity and classification of the common North American insects.

The Book Sells for $4.00

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Insect Enemies of Shade Trees

By GLENN W. HERRICK

This book discusses primarily the problem of preservation of shade trees from insect pests also describing accepted methods of fertilizing shade trees. It is intended for pest control operators engaged in the business of treating and caring for shade trees, and for all others interested in preserving shade trees. The book discusses in detail all the important insect enemies of shade trees east of the Rocky Mountains, and most of those on the Pacific coast. The book is illustrated with 350 photographs and drawings. Contains 417 pages. **Price, $5.00.**

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Sanitary Entomology

Edited by WILLIAM DWIGHT PIERCE, Ph.D.

A volume of expert, up-to-date information on how insects cause or carry disease; how these insects live; how to prevent disease by controlling insects.

The book also contains information concerning: disinfection of garments; drainage problems; disposal of garbage, excreta, and manure; handling of hog pens, chicken yards and stable yards.

Our Special Price, $3.15

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

New 1939 Chemical Formulary

Not a revised edition but a completely new book. Contains over 600 pages containing thousands of practical formulae—many of which have never before been made public. Simple, accurate instructions are given for making every conceivable type of product and material, for use in the home, office, school and factory. **The Price, $6.00.**

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

"How to Know the Insects"

A very valuable book for every pest control operator. This book, with its 140 pages and more than 250 careful drawings, is an excellent reference book for P.C.O.'s as well as for experienced entomologists.

Price for spiral binding.....$1.00
Price for cloth binding..... 1.80

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

An Introduction to Entomology

By JOHN HENRY COMSTOCK

With the aid of the 1044 pages of lucid descriptions and 1228 illustrations in this book, all of the important North American insects can be readily identified. $5.00 **Postpaid.**

Order from PESTS, 514 East 14th St., Kansas City, Missouri.

Business Opportunities

(Classified)

RATES — For individuals seeking employment, 5c per word, minimum $1.00. All others 10c per word, minimum $2.00. All advertisements must be in the hands of the publishers seven days before publication date and must be accompanied by cash or money order for payment in full. The publishers are not responsible for any false or misleading advertisements.

FLOOR BRUSHES—We manufacture a very complete line. Catalogue sent upon request. Flour City Brush Company, Minneapolis, Minn., or Pacific Coast Brush Co., Los Angeles, Calif.

"DEAD SURE" BRAND

Non-Poisonous Solid Chemical

RODENT DESTROYERS

GENERATE HIGH PRESSURE POISON GAS THAT

KILLS ALL PESTS THAT BREATHE!

ANIMAL OR INSECT!

No Apparatus or Mask!

Add this profitable garden and house pest control department to your regular work! Sensation of the Omaha Convention!

Write now to the

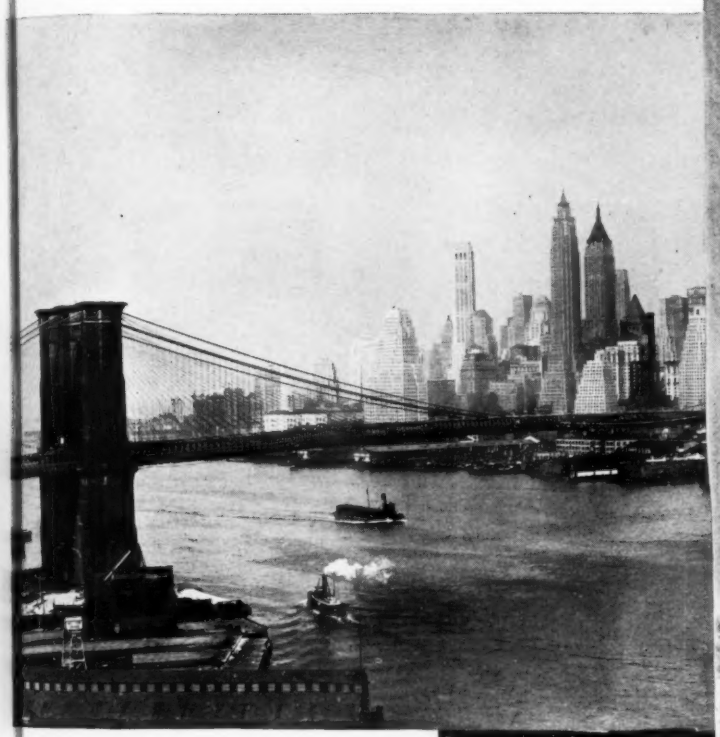
PACIFIC STATES RODENT DESTROYER Co.

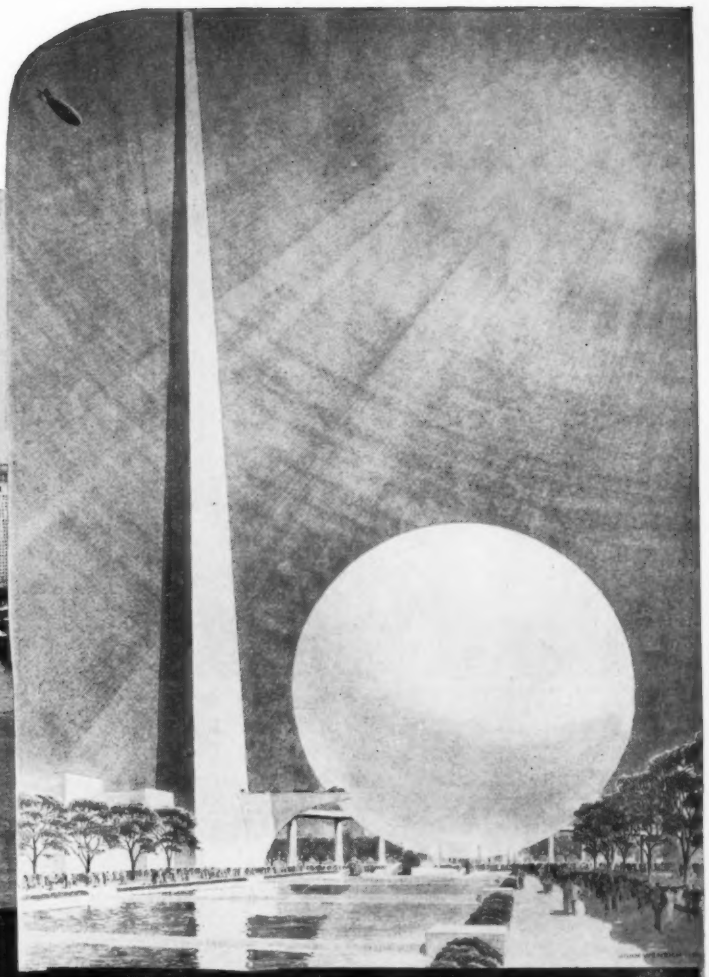
Los Gatos, California, U.S.A.

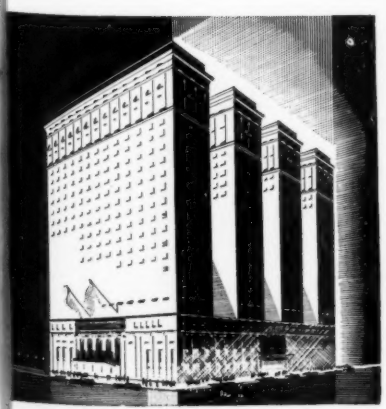
Members, National Pest Control Association

New York—1939 Convention City

New York Skyline, Broadway at night and the Perisphere and Trylon —the theme of the New York World's Fair.







National Convention Headquarters
Hotel Pennsylvania

More *business*-more *profits* with 2-way ANT-X *sales!*

The *Indoor*
DEATH BOX

No complicated directions to follow—no holes to punch—A TWIST OF THE WRIST AND IT'S READY TO USE. Destroys both sweet and grease eating ants. Locked cover assures utmost safety in the home. Cannot be opened by a child or spilled by any domestic pet.

Only one size, retails at 25c

Combined profits from ANT-X service to your customers and ANT-X packaged sales over the counter will make it the biggest and steadiest income-producer of its kind in your locality. You can afford to promote ANT-X both ways —to the customer you service and to store purchasers.

Easy to *USE* . . . Easy to *SELL*

You'll *prefer ANT-X* to others in your own extermination work—just as your customers will prefer it to all other packaged ant-killers . . . because it's the *most efficient* and the *least expensive* method of *complete* ant extermination. And it's put up in the most attractive and most useful forms for retail sales—backed by bigger and more aggressive national advertising every season!

The *Outdoor*
DEATH TUBE

A drop on the surface kills ants in the nest. Specially prepared for golf courses, lawns and green-houses. Also brings certain death to rats, mice, roaches, flies, etc.

Garden size handy tube retails at 25c. Estate size handy tube retails at $1.00. ANT-X Jelly Bait also available in the economical 5-lb. pail.

Retail prices all subject to special professional discounts.

ANT-X "*Their last meal!*"

You Get More But Pay Less

Brand	Size	List	YOU SAVE
A	1 oz.	35c	.....
B	1 oz.	35c	.....
ANT-X	**1¼ oz.**	**25c**	**$14.40 per gross**

Tremendous savings—Mr. Operator, SO WHY PAY MORE? BUY ANT-X and SAVE THE DIFFERENCE. If you have not taken advantage of our special **"FREE TUBE"** offer, write at once, *today,* for your free sample of ANT-X Death Tube or ANT-X Death Box. No obligation, of course.

This advertisement is not intended for any State or locality (especially State of California), where it is unlawful to sell for use or possession by the general public of Thallium Sulphate, or any combination of the salts thereof.

NOTT MFG. CO., *General Offices, 87 Frankfort St., N. Y. C.*

Branches at Chicago, Ill., Miami, Fla., Durham, N. C., Portchester, N. Y.